A GUIDE TO THE CODE OF PRACTICE FOR PITS

October 2004

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Alberta Environment

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1.0 INTRODUCTION

This Guide explains how sand, gravel, clay or marl pits that are five hectares (12.5 acres) or larger on private land[1] are regulated through the *Code of Practice for Pits*. It includes:

- Information on the classification of pits
- A description of the registration process
- Guidance on the various sections of the Code of Practice
- Guidance on developing an Activities Plan
- Guidance on security
- Planning and operating guidance
- A brief discussion of other applicable provincial and federal legislation
- A checklist for applications
- Sample drawings to support the Activities Plan, and
- Other information sources

The Code of Practice was made under the *Conservation and Reclamation Regulation*[2]. Registration holders[3] must meet all the requirements of the *Code of Practice for Pits*.

The Code of Practice and this Guide do not apply to pits located on public land[4]. Contact the nearest Public Lands office[5] for proposed operations on public land. Pits on public land are subject to the requirements of the *Environmental Protection and Enhancement Act* and the *Conservation and Reclamation Regulation* as well as the *Water Act*.

1.1 Definition of Pit

The *Activities Designation Regulation* identifies which activities require an approval, a registration or must provide notice under the Act. In the *Activities Designation Regulation*, a **pit** that requires registration is defined as[6]:

> An opening or excavation in or working of the surface or subsurface for the purpose of removing any sand, gravel, clay or marl, where the area of the pit and any associated

---

[1] **Private land** means deeded or patent land, Special Areas Board land, Métis Settlements and provincial parks.

[2] References to Acts and Regulations in this Guide were current at the time of publication. Readers should refer to the Queen's Printer's website for the most recent version of Acts and Regulations (http://www.qp.gov.ab.ca/catalogue/)

[3] A **registration holder** is a person who holds a valid registration for a pit issued by a Director from Alberta Environment This will be the person who is identified in the application for registration under Schedule 1(a) of the Code of Practice

[4] **Public land** means land of the Crown in right of Alberta to which the *Public Lands Act* applies Note that this may include bed and shore of waterbodies anywhere in the Province

[5] http://www3.gov.ab.ca/srd/info/contactssrd.cfm

[6] *Activities Designation Regulation* s 3(3)(d)

infrastructure, including stockpiles, connected with the pit is or at any time was greater than or equal to 5 hectares (12.5 acres), but does not include

(i) a borrow excavation,

(ii) a pit on public land,

(iii) a pit, or a portion of a pit, where the surface or subsurface of the land has not been disturbed by pit operations since August 15, 1978, or

(iv) a pit, or a portion of a pit, on which a waste management facility is operating or operated pursuant to a valid approval or registration under the Act.

Note that a pit that is larger than five hectares but then gets smaller through reclamation is still a pit for the purposes of the Code of Practice. Therefore the pit registration stays in effect and all provisions of the Code apply, including the requirement to maintain security, for the entire life of the pit.

Where more than one pit is located on a parcel each will be treated as a separate pit for purposes of interpreting the five-hectare rule. However, if two or more pits on a parcel share infrastructure (e.g., access road, stockpiles, processing equipment, weigh scales) they will be treated as a single pit. The sum of their areas determines if the five-hectare trigger has been met.

Where a pit straddles more than one parcel it will still be viewed as a single pit (e.g., a seven hectare pit straddles two parcels, with four hectares in one parcel and three in the other – this is a seven hectare pit not a four hectare and a three hectare pit).

A **borrow excavation** is defined as[7]:

An excavation in the surface made solely for the purpose of removing borrow material for

(i) the construction of the sub-base for a specific roadway project, or

(ii) the construction of a dam, canal, dike, structure or erosion protection works associated with a provincial water management infrastructure project

and includes any associated infrastructure connected with the borrow excavation.

A *provincial water management infrastructure project* is one that will be licensed to the province upon completion. Dams and other water management structures developed by the private sector or Irrigation Districts are not provincial water management infrastructure projects. Therefore the excavations supplying material for those projects are pits not borrow excavations, and are subject to the Code of Practice.

Infrastructure is defined as[8]:

Any works, buildings, structures, facilities, equipment, apparatus, mechanism, instrument or machinery belonging to or used in connection with a pit, and includes any storage site or facility, disposal site or facility, access road, haul road, railway or telecommunication line

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[7] *Activities Designation Regulation* s 3(3)(a)

[8] *Activities Designation Regulation* s 3(3)(c)

For administrative purposes, Alberta divides pits into two classes:

- **Class I pits** are greater than or equal to five hectares on private land and are subject to the requirements of the *Code of Practice for Pits* or an existing approval issued under the *Environmental Protection and Enhancement Act* as well as the requirements of the Act and the *Conservation and Reclamation Regulation*. Operators are also encouraged to use applicable Chapters[9] (e.g., 4, 6, 8, and 10) as a resource for additional guidance on planning and carrying out pit operations.
- **Class II pits** are less than five hectares on private land. They are subject to the requirements of the Act and the *Conservation and Reclamation Regulation*[10]. Class II pit operators should refer to the *Environmental Protection Guidelines for Pits* for more guidance on conducting activities at their pits. The Guidelines may be obtained on the web at http://www3.gov.ab.ca/env/protenf/landrec/publications.html or from the local Alberta Environment office[11]. Operators of Class II pits on private land must cease operations once the pit has reached five hectares (i.e., once they become a Class I pit) until the pit operator has applied for and received a registration from Alberta Environment.

If operators are unsure of the class of their pit they should consult staff in the local Alberta Environment office.

All pits are subject to the *Water Act* and its associated regulations and Codes of Practice. Chapter 8.2 provides more information on the *Water Act*.

1.2 Other Regulatory Requirements

In addition to the Code of Practice, registration holders must comply with all the requirements of the *Environmental Protection and Enhancement Act* and its associated regulations and Codes of Practice, the *Water Act* and its associated regulations and Codes of Practice, and all other applicable Federal and Provincial laws.

Registration holders should review the relevant legislation to determine how it may apply to their pit operations. Chapter 8 includes a brief summary of applicable Provincial legislation and Codes of Practice, as well as Federal legislation.

Copies of provincial legislation, regulations and Codes of Practice can be obtained from the Queen's Printers or on their website at http://www.qp.gov.ab.ca/catalogue/

- Main Floor, Park Plaza, 10611 - 98 Avenue, Edmonton, AB T5K 2P7
  Phone: (780) 427-4952 or Fax: (780) 452-0668
- Main Floor, McDougall Centre, 455 – 6th Street SW, Calgary, AB T2P 4E8
  Phone: (403) 297-6251 or Fax: (403) 297-8450

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[9] **Chapter** refers to a Chapter in this Guide.

[10] Alberta Environment is working with stakeholders to review the option of expanding coverage of the *Code of Practice for Pits* to include Class II pits

[11] Local Alberta Environment offices may be found on the web at http://www3.gov.ab.ca/env/protenf/landrec/offices.html

1.3 Responsibility for Activity at a Pit

Only one person or company is designated as the registration holder of a pit. The registration holder may allow other people to use the pit but the registration holder is responsible for ensuring compliance with the Code of Practice by all users of the pit.

The registration holder should appoint one person who will be completely familiar with the pits operations and the requirements of the Code of Practice. Ideally this is the person identified in the application under Schedule 1(c) of the Code of Practice as the primary contact. This person should, in turn, ensure that all persons carrying out activities at the pit are aware of the regulatory requirements and the company's environmental operating guidelines.

1.4 Inspection and Enforcement

Alberta Environment inspectors will conduct random, unannounced inspections, as well as planned inspections, to determine if registration holders are following the Code of Practice. Inspections will likely be more frequent if a registration holder has a history of non-compliance and/or if the pit is in area where there are environmental issues or public concerns.

Failure to follow the Code of Practice may result in enforcement action. Enforcement options are varied and depend on the circumstances of the non-compliance.

Registration holders should review the enforcement website at http://www3.gov.ab.ca/env/protenf/enforcement/index.html and the Compliance Assurance Principles document at http://www3.gov.ab.ca/env/protenf/documents/CAP_Final_2000.pdf.

1.5 Continuous Improvement

Alberta Environment expects registration holders, and industry as a whole, to continuously review operating practices and equipment with the objective of improving environmental performance.

Areas of focus for continuous improvement include, but are not limited to:

- Minimizing the footprint of the development
- Minimizing disturbance of sensitive environments
- Maximizing resource extraction
- Minimizing water use
- Reducing dust, noise and contamination
- Improving effectiveness of soil handling equipment and processes
- Maximizing direct placement of topsoil
- Maximizing speed of progressive reclamation
- Reducing equipment emissions

1.6 Terminology

In this document, the words *must*, *shall* and *required* describe actions that a registration holder or person carrying out activity at a pit are obliged to undertake or are not allowed to undertake by virtue of an Act, a regulation or the *Code of Practice for Pits*.

Words such as *may*, *should* or *recommended* describe actions that are encouraged and that will likely lead to greater chances of successful pit operation.

NOTE: For the purposes of this Guide the term *registration holder* means the applicant for a registration in the case of an unregistered pit or the registration holder in the case of a registered pit.

1.7 Further Information

For further information on the Code of Practice or the Guide please contact the local Alberta Environment office. Office locations and phone numbers can be found on the web at http://www3.gov.ab.ca/env/protenf/landrec/offices.html or by calling the RITE operator toll-free at 310-0000 and asking for the approval manager at the closest Alberta Environment office.

1.8 Disclaimer

Although this guidance document is intended to be as comprehensive as possible, its purpose is to provide a broad overview of Alberta Environment's requirements with respect to pits on private land greater than or equal to five hectares in size. It does not replace or affect the actual legislative requirements.

For more detailed information, it is recommended that you refer directly to the

- *Environmental Protection and Enhancement Act*
- *Activities Designation Regulation*
- *Conservation and Reclamation Regulation*, and
- Code of Practice for Pits

If there is any conflict between this document and the *Environmental Protection and Enhancement Act* or its regulations, or the *Water Act* or its regulations, the Acts and the regulations take precedence.

2.0 REGISTRATION PROCESS

This Chapter provides guidance on applying for a registration. No one may carry out any activity at a pit unless a registration number has been received from the Director[12]. Failure to register may result in enforcement actions being taken against the pit operator[13].

General information on the registration process under the *Environmental Protection and Enhancement Act* may be found at http://www3.gov.ab.ca/env/protenf/approvals/factsheets/EPEA_RegistrationProcess.pdf.

2.1 Transition from Approval to Code of Practice

Pits that have an approval as of November 1, 2004, the date the *Code of Practice for Pits* came into force, will continue to be subject to their approval[14] until the earliest of:

- The expiry date of the approval
- The date specified in writing by the Director following a request in writing from the approval holder for an amendment to the approval
- The date specified in writing by the Director following a request in writing by the approval holder to cancel the approval, or
- November 1, 2008

The approval holder must register their pit prior to the applicable trigger date. No person may carry out an activity at a pit if the approval has expired or has been cancelled and there is no registration.

If an application for an approval was made prior to November 1, 2004 but the approval had not yet been issued the applicant may request the Director continue to process the application after November 1, 2004[15]. Applicants are encouraged to discuss the options with the Director as soon as possible. The new approval will expire on November 1, 2008 at the latest.

2.2 Application for a Registration

All of the information described in Schedule 1[16] of the Code of Practice must be included in the application for registration (Section 3.1.2 and Chapter 9 for an application form). If an applicant does not have a facsimile machine or e-mail these may be omitted. An Activities Plan that details the construction, operation and reclamation plans for the pit must also be submitted with the application (Section 3.1.3 - see Chapter 4 for advice on the content of an Activities Plan and Chapter 9 for a form). Finally, the registration cannot be granted until security for the pit in an amount and form acceptable to the Director has been provided to the Director (section 3.3.1 - see Chapter 5 for advice on security and Chapter 9 for a form).

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[12] The **Director** is the District Approvals Manager in the local Alberta Environment office.

[13] Definition of **operator** in *Environmental Protection and Enhancement Act* s. 134(b)

[14] *Activities Designation Regulation* s. 10.1(1)

[15] *Activities Designation Regulation* s. 10.1(2)

[16] **Section, Schedule** and **Part** refer to Sections, Schedules and Parts of Schedules in the Code of Practice.

The person or company named in the application (Schedule 1(a)) will be the registration holder for the purposes of the Code of Practice.

It will take a minimum of 60 working days to process complete applications. Applications will be processed quicker if all the required information is provided with the application. Applicants should build this timeline into their plans for the site, especially if the pit is being developed to satisfy a specific contract.

Send two copies of the application to the Regulatory Approvals Centre, Alberta Environment, 1st Floor, 9820 – 106 Street, Edmonton, Alberta T5K 2J6. The Regulatory Approvals Centre will then send it to the appropriate region for processing.

2.3 Application Review Process

The Director will determine if all of the information is present and meets the administrative and technical requirements. The Director will deem the application complete or request further information from the applicant (see Figure 1). If there is a lot of information missing, or the application content is not acceptable, the Director may return the application to the applicant and instruct the applicant to provide a new, complete application.

Once the application is deemed complete, the Director will review the applicant's security estimate (see Chapter 5). The Director may request further information from the applicant or, if the estimate is not acceptable, the Director may return the estimate to the applicant and instruct the applicant to provide a new, complete estimate.

Once the estimate is approved, the Director will request the applicant to provide the appropriate amount of security in a form acceptable to the Director. Once the Director has received the security, the Director will issue the registration.

Where the pit also requires authorization under the *Water Act*, the Director may choose to issue the registration and *Water Act* authorization at the same time. The Director will also notify the local authority that a registration has been issued.

Registration holders should make note of the registration number of the pit provided by the Director as this will be the number used in future reporting and correspondence.

2.4 Landowner Permission

A registration holder may not carry out any activity at a pit on private land unless they have written permission from all the registered owners of the parcel or parcels on which the pit is located (Section 3.2.1). Permission is also needed for any access roads on private land and other infrastructure that forms part of the pit.

Written permission must be maintained through the life of the pit. If land ownership changes the registration holder must obtain written permission from the new registered owners.

It is also important to discuss current and final land use (following reclamation) with the landowner to ensure they concur with the plans. Only upon issuance of a reclamation certificate by Alberta Environment, or a transfer of the registration to another pit operator, can any surface lease agreement with the landowner be surrendered[17].

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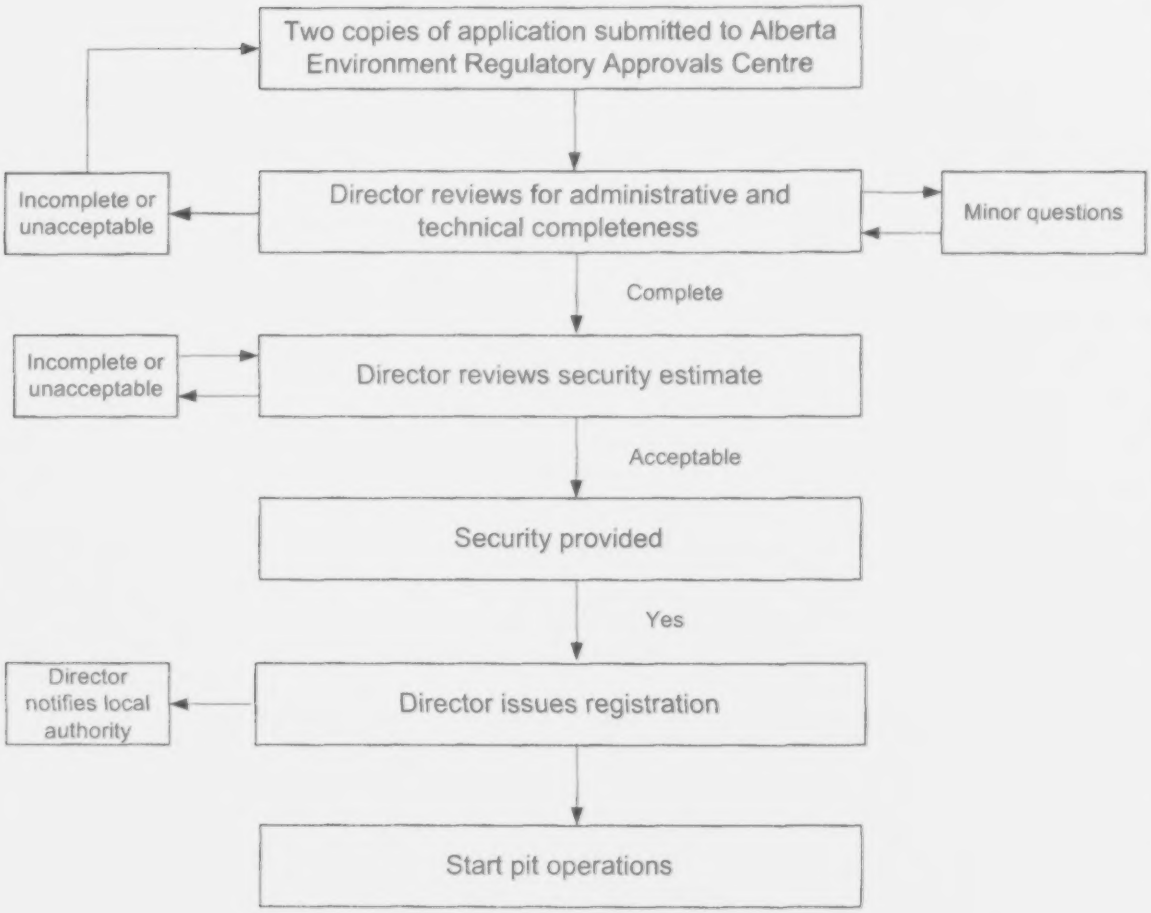
[17] *Environmental Protection and Enhancement Act* s 144

Figure 1. Flowchart of Registration Application Review Process



2.5 Municipal Requirements

Municipalities may require approvals for rezoning (land-use re-designation) and Development Permits if appropriate bylaws exist in the municipality. The municipality in which the proposed pit is located should be contacted to determine the permitted land uses and application content requirements. Further information on the context for municipal land use planning is available in the document *Land Use Policies* (http://www.municipalaffairs.gov.ab.ca/mahome/ms/pdf/LandUsePoliciesMGA.pdf).

Through the Development Permit, the local municipality decides where pits may be located and deals with issues such as hours of operation, buffers, noise, dust, haul routes, and traffic control.

In some circumstances, land use re-designation must occur before the Development Permit is issued. The company must confirm with the local municipality that the pit operation is an acceptable land use. The process of obtaining a Development Permit may also require public notice (advertising) and a public hearing.

Alberta Environment does not require proof of municipal authorization prior to issuing the registration. However, once pit operations start, the registration holder should produce a copy of the Development Permit upon request by Alberta Environment. Registration holders should be aware that some municipalities prefer to have their processes completed before a company obtains authorization from other agencies.

2.6 Starting Operations

No activities may be carried out at the pit until the Director has provided a copy of the registration to the applicant (Section 3.1.1 of the Code and sections 60 and 61 of the *Environmental Protection and Enhancement Act*).

3.0 AFTER REGISTRATION

The Code of Practice requires the registration holder to perform certain duties during the life of the pit. This Chapter, and Figure 2, provide guidance on these duties.

3.1 Changes to Corporate Status

Registration holders must notify the Director if there are any actions related to bankruptcy, creditor protection, appointment of a receiver or receiver-manager, or seizure of assets (Section 2.1.6).

Registration holders should notify the Director if there are any changes to the corporate status of the registration holder or changes in the contact information for individuals designated by the registration holder as the primary contact for the pit.

3.2 Changes to the Activities Plan

No person may carry out an activity at the pit except in compliance with the most recent Activities Plan that has been filed with and authorized in writing by the Director (Section 4.1.1). However, the Activities Plan may need to change as more information about the resource becomes available or as new contracts for product come up.

The registration holder must apply to the Director to make changes to the Activities Plan information contained in Part 2 of Schedule 2 in the Code of Practice (Section 4.1.2). The Director must authorize the change that is applied for before the change can be implemented. Once the Director has authorized the change it becomes part of the "most recent Activities Plan" for purposes of compliance with Section 4.1.1. As in the application review phase, the more complete the information provided to the Director about the proposed change the quicker the authorization will be granted.

The Director does not have to authorize changes to the information in Part 1 of Schedule 2 of the Code of Practice. However, the Director may require a registration holder to develop and submit a new Activities Plan at any time (Section 4.1.3). The registration holder must submit the revised Activities Plan within 30 days after the Director's request and the plan must contain all of the information required in Schedule 2 of the Code of Practice (Section 4.1.4). The Director will authorize the updated Activities Plan and this will become the "most recent Activities Plan" for purposes of compliance with Section 4.1.1.

The Director is most likely to ask for a new plan when:

- An inspection indicates the site has changed substantially since the last plan was authorized
- There are compliance concerns (which may also trigger enforcement actions – see Chapter 1.4)
- A significant number of requests for changes to the Activities Plan have been submitted

3.3 Pit Water Monitoring

The Code of Practice requires that samples of pit water that is being discharged be collected and analysed (Section 4.2) for pH and total suspended solids (TSS). Presence of hydrocarbons must also be assessed. The registration holder must record and retain copies of the analyses of the

samples. The Code of Practice dictates the sampling type, frequency and location, and the parameters that must be analysed. The analysis methods (Section 2.1.7) must meet the requirements in the *Methods Manual for Chemical Analysis of Water and Wastes* (Alberta Environment 1996) and the *Standard Methods for the Examination of Water and Wastewater, 20th Edition* (American Water Works Association, 1998).

Registration holders should be aware that the Total Suspended Solids limit of 100 mg/L is a historical limit carried over from previous pit approvals. Many other industrial approvals issued by Alberta Environment require adherence to a lower limit of 50 mg/L. The *Surface Water Quality Guidelines for Use in Alberta* (Alberta Environment 1999; Table 1.0) have a limit of not more than 10 mg/L above background for the protection of freshwater aquatic life. The potential impact of a discharge on a water body will depend on the volume of discharge relative to the flow or volume of the water body – registration holders should evaluate their proposed discharge and the receiving water body to ensure that the discharge will not cause adverse effects, and adjust the concentration, volume or timing of the discharge as needed.

If a pit water sample exceeds the limits prescribed in the Code of Practice the discharge must be stopped (Section 4.2.1) and the registration holder must report the contravention of the Code of Practice to Alberta Environment (see Chapter 3.5.1).

Registration holders should sample and analyse pit water prior to discharge (e.g., in sediment ponds) to reduce the potential of discharging water that exceeds the limits specified in the Code of Practice.

The Director or an inspector may require any person at any time to take and analyse samples of pit water and provide the results to the Director or inspector (Section 4.2.3).

3.4 Landowner Contact

The Code of Practice has various sections that require landowner contact. Registration holders are required to obtain landowner signoff and to consult the landowner for specific activities undertaken at the pit. The registration holder must retain these written authorizations or records of consultation and be prepared to produce them at any time.

3.4.1 Use of Alternative Materials For Reclamation

The Code of Practice requires the registration holder to obtain written consent of all registered landowners if the registration holder intends to use material other than topsoil, subsoil, overburden or reject from the pit for reclamation (Section 5.2.2 - see Chapter 4.11.4 for more guidance on use of alternative materials). Written consent should be obtained prior to use of the materials.

3.4.2 Revegetation

The Code of Practice requires the registration holder to consult in writing with all the registered landowners about the proposed revegetation seed mixture or other forms of revegetation material that will be used (Section 5.2.8). Landowners may have specific species or varieties they wish to be used. They may also be able to provide land management details, such as planned crop rotations or grazing schedules, which will help the registration holder develop a plan.

3.4.3 Final Reclamation

The Code of Practice requires the registration holder to provide written acknowledgement of the receipt of the Final Reclamation Report by the registered landowners (Section 6.1.9 and Schedule 4, Part 2(f) – see Chapter 3.5.3 for more information on the Report).

3.5 Reporting

The Code of Practice requires various types of reporting that the registration holder must comply with.

3.5.1 Contravention Report

Contraventions of the Code of Practice must be immediately reported to the Director using Alberta Environment's industrial reporting line at 1-780-422-4505 (Section 6.1.1). The Code of Practice describes the information that must be submitted with the report (Section 6.1.3).

The reporting provides an opportunity for the registration holder to indicate what happened and why, and what will be done in the future to prevent similar problems in the future.

Failure to report a contravention is a contravention of the Act[18].

3.5.2 Five Year Report

Registration holders must submit a report to the Director, starting five years after registration and then every five years after that until the Final Reclamation Report described in Chapter 3.5.3 below is submitted or a reclamation certificate for the whole pit is received (Section 6.1.4). The Code of Practice specifies the information to be provided in Schedule 4, Part 1 and requires that the data be collected within 60 calendar days of report submission. No activity may occur at the pit after the date the report is due unless the report has been submitted (Section 6.1.6). Chapter 9 provides a form for the report.

The report provides information on the disturbance and reclamation status of the pit and will be used by Alberta Environment to collect and report province-wide data on industry's reclamation performance. In support of developing and reporting on performance as soon as possible, registration holders are encouraged to provide the pit disturbance and reclamation data on registration in those cases where pit development is already underway.

The disturbance and reclamation data will be provided for:

- Active area – all areas of a pit, measured in acres or hectares, where topsoil has been salvaged, or topsoil has been stockpiled, but does not include reclaimed area or certified area. This includes but is not limited to areas where aggregate or reject is being or has been extracted or processed, infrastructure or roads are being or have been placed, depleted areas of the pit, and pre-stripped buffers in advance of the pit face. It also includes topsoil stockpiles (the Code allows topsoil to be stockpiled directly on topsoil) and any areas that are part of the pit but may not have initially had topsoil to salvage (e.g., waterbodies, previously disturbed areas).

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[18] s. 227(j) of the *Environmental Protection and Enhancement Act*

- Reclaimed area – the area of a pit, measured in acres or hectares, where the landscape has been re-established, the topsoil has been replaced and vegetation has been established, but does not include any certified area;
- Certified area – the area of a pit, measured in acres or hectares, that is the subject of a reclamation certificate.

The definitions for the different categories of land used in reporting are specific to the reporting requirement. They do not affect the calculation of reclamation security (see Chapter 5), which looks at the actual level of work remaining to finish reclamation. For example, land still categorized as active area for reporting purposes because it has not yet been revegetated could have had the majority of the costly reclamation work already done (overburden replacement, landscaping, soil replacement) and thus have low security requirements.

3.5.3 Final Reclamation Report

The registration holder must submit a Final Reclamation Report no later than three years after the entire pit has been revegetated unless a reclamation certificate for the whole pit has been received (Section 6.1.7). The information required in the report is specified in the Code of Practice in Schedule 4, Part 2 (Chapter 9 provides a form). The drawings that are required should follow the same format as the drawings required for the Activities Plan (see Chapter 10 for samples).

3.6 Operating Record

The Code of Practice specifies in Schedule 5 the information that must be retained by the registration holder. This information must be maintained for a minimum of five years after the final reclamation certificate is issued for the pit.

It is recommended that a copy of the operating record be kept at the pit.

3.7 Providing Information on Request

The registration holder must provide any of the information established or recorded pursuant to the Code of Practice to the Director or an inspector within seven days or any other time specified by the Director or an inspector (Section 6.1.10).

3.8 Transfer of Registration

The Director must approve any transfer of a registration from a registration holder to another person[19]. The Director may require the new registration holder to provide a new Activities Plan for the site or to confirm in writing that they will follow the existing Activities Plan. The transfer is only in effect when the new registration holder has provided the appropriate security to the Director. The original registration holder's security will be returned when the transfer is complete.

Until the Director authorizes the registration transfer the current registration holder is held accountable for the pit.

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[19] *Approvals and Registrations Procedure Regulation* s. 11

3.9 Reclamation Certification

Under the *Environmental Protection and Enhancement Act* a registration holder is required to reclaim the pit and to obtain a reclamation certificate[20]. The registration holder must apply to Alberta Environment for the reclamation certificate and provide the required information and the application fee. The reclamation certification process is described in the Act and the *Conservation and Reclamation Regulation.*

Registration holders should review the information requirements for a certificate application listed in the *Conservation and Reclamation Regulation*[21] and then contact the local Alberta Environment office if there are any questions.

3.10 Surrender of Surface Lease

Under the *Environmental Protection and Enhancement Act* no surrender of a surface lease is effective until the registration holder has obtained a reclamation certificate from Alberta Environment[22] or the registration has been transferred to another person.

3.11 Liability

The registration holder continues to remain liable for conservation and reclamation issues at the site until a reclamation certificate is issued.

As well, under the *Environmental Protection and Enhancement Act* and the *Conservation and Reclamation Regulation* the registration holder remains liable for reclamation issues that arise on the site for five years after certification[23]. These reclamation issues can only be ones that were not apparent at the time the certificate was issued.

Also, the registration holder remains liable forever for contamination issues resulting from their activities at the pit after the reclamation certificate is issued[24].

3.12 Terminating the Registration

Once the entire pit has received a reclamation certificate the registration holder may apply to have the registration terminated.

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[20] s. 137 of the *Environmental Protection and Enhancement Act*

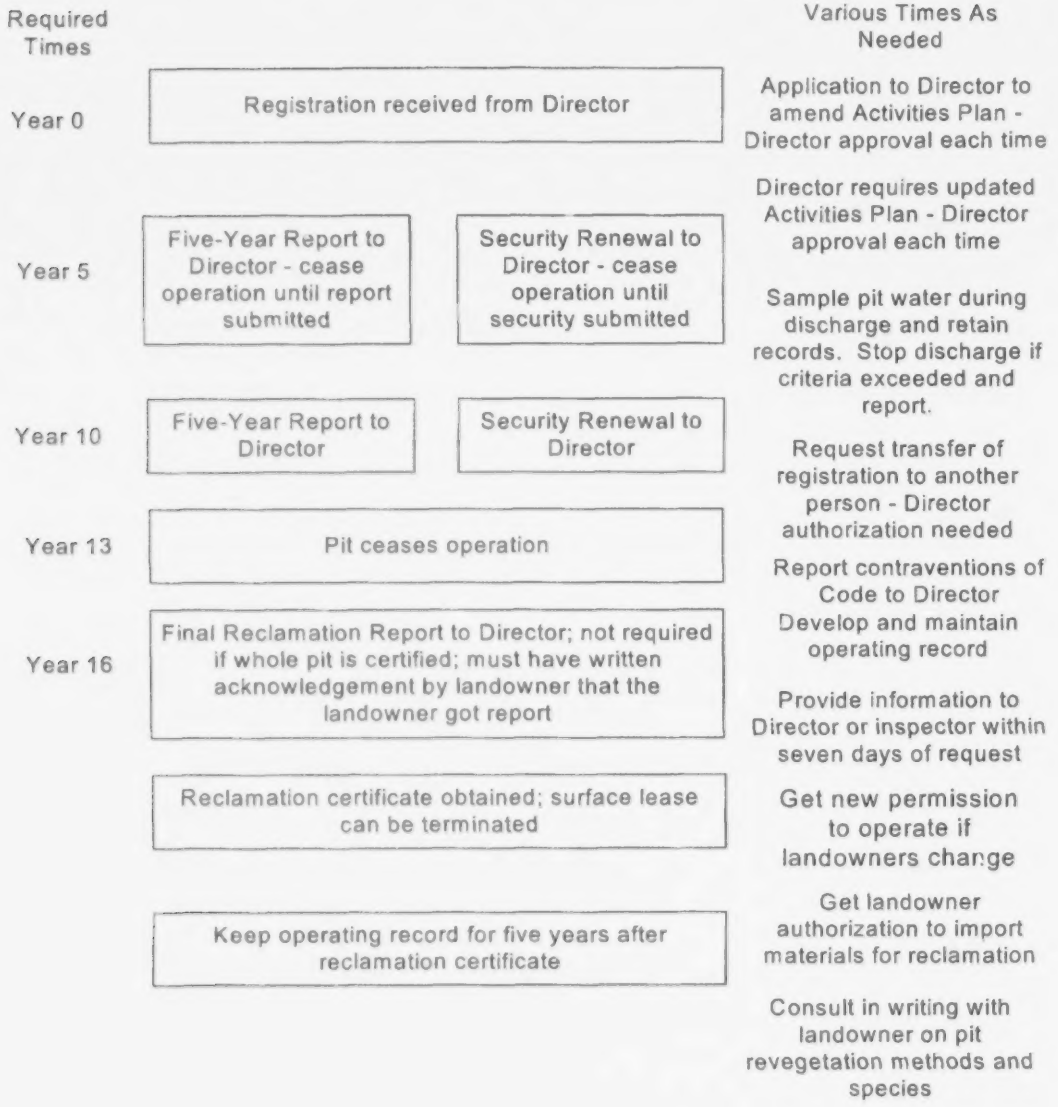
[21] s. 12 of the *Conservation and Reclamation Regulation*

[22] s. 144 of the *Environmental Protection and Enhancement Act*

[23] s. 142 of the *Environmental Protection and Enhancement Act* and s. 15 of the *Conservation and Reclamation Regulation*

[24] s. 112 and 113 of the *Environmental Protection and Enhancement Act*

Figure 2. Flowchart of Responsibilities after Registration for a 13 Year Pit


Required Times
Various Times As Needed
Year 0
Registration received from Director
Application to Director to amend Activities Plan - Director approval each time
Director requires updated Activities Plan - Director approval each time
Year 5
Five-Year Report to Director - cease operation until report submitted
Security Renewal to Director - cease operation until security submitted
Sample pit water during discharge and retain records. Stop discharge if criteria exceeded and report.
Year 10
Five-Year Report to Director
Security Renewal to Director
Request transfer of registration to another person - Director authorization needed
Year 13
Pit ceases operation
Report contraventions of Code to Director
Develop and maintain operating record
Year 16
Final Reclamation Report to Director; not required if whole pit is certified; must have written acknowledgement by landowner that the landowner got report
Provide information to Director or inspector within seven days of request
Reclamation certificate obtained; surface lease can be terminated
Get new permission to operate if landowners change
Keep operating record for five years after reclamation certificate
Get landowner authorization to import materials for reclamation
Consult in writing with landowner on pit revegetation methods and species

4.0 ACTIVITIES PLAN

The Code of Practice requires the registration holder to maintain a current Activities Plan. Schedule 2 of the Code of Practice details the information that must form part of the Activities Plan.

The purpose of the Activities Plan is to clearly describe the characteristics of the site and the sequential plans for construction, operation and reclamation of the pit. Registration holders are encourage to discuss the proposed contents of their Activities Plan with the local Alberta Environment office and to determine if specific sections need greater emphasis due to local environmental issues (e.g., buffers around sensitive areas, dust control).

The registration holder and all people carrying out activities at the pit must do so in compliance with the most recent Activities Plan authorized in writing by the Director (Section 4.1.1). It is strongly recommended that a copy of the most recent Activities Plan be kept at the pit and that all persons carrying out activities at the pit be made aware of the plan and the Code of Practice.

The following sections provide guidance on the information that should be included in the Activities Plan. Changes to Schedule 2, Part 1 sections must be updated when the Director requests the registration holder to do so. The Director must authorize changes to Schedule 2, Part 2 sections in writing before the change is implemented (see Chapter 3.2).

Additional guidance on planning and carrying out pit operations is provided in Chapters 6 and 7 of this Guide, respectively.

4.1 Part 1(b) - Current Pit Size

Pit size includes the excavation where aggregate is being removed, any areas where reclamation material has been salvaged and stockpiled, and all the areas described by the term *infrastructure* as defined in the *Activities Designation Regulation*. Areas disturbed while the pit was a Class II pit must also be reported here.

Pit size should be determined through a survey. The survey will assist with developing the site drawings.

4.2 Part 1(c) - Thickness of Topsoil, Subsoil, Overburden and Aggregate

The Activities Plan must provide information on thickness of topsoil, subsoil, overburden and aggregate. This information assists in planning pit sequence and storage needs. It will also help prepare the security estimate and set reclamation goals.

Test excavations that will not form part of the pit should be reclaimed to the same standards as the pit.

4.2.1 Topsoil and Subsoil

The soil types, locations and depths on the proposed pit should be identified through a soil testing program. The depths of soil horizons determine salvage depths. The volumes of topsoil and subsoil determine the best methods of soil handling and replacement. The soil type and topography helps determine post-reclamation goals.

A qualified soil specialist should conduct the inventory. The specialist should:

- Use an appropriate inspection density (Alberta Soils Advisory Committee, 1993)

- Conduct the inventory at the proper time (i.e., avoid frozen, snow covered, dark or wet conditions)
- Use appropriate inspection techniques and equipment, and
- Obtain correct soil information using appropriate techniques and systems (Expert Committee on Soil Survey, 1982; Agriculture and Agri-Food Canada, 1998; C&R/IL/92-2 for winter surveys).

4.2.2 Overburden and Aggregate

The extent of overburden and aggregate deposits should be determined using auger drilling, backhoes, or both. The type, distribution, thickness and variability of deposits and their position relative to the water table should be established. Volumes of different materials to be extracted can then be estimated and operations planned most efficiently.

Some areas and material types are known to have a high ratio of reject to product (e.g., Kinsella area). It is important that during the initial planning process, the moving, storage, and final placement of reject material be considered. In some cases, this reject material may become a product depending on future product specification, distance to market and local supply and demand. Excessive volumes of reject may become a storage and management problem and create a substantial reclamation liability for which the registration holder must provide security.

4.3 Part 1(d) - Topsoil Texture

The Activities Plan must describe topsoil textures. It is recommended that the description be based on *The System of Soil Classification for Canada, Third Edition* (Agriculture and Agri-Food Canada, 1998). Textures may be assessed by hand texturing or by analytical methods.

4.4 Part 1(e) - Erosion and Dust Control Techniques

Erosion control and dust control techniques must be described in the Activities Plan.

4.4.1 Erosion Control

Construction and operation activities at a pit exposes land to erosional forces that can lead to adverse environmental impacts such as siltation of water bodies and loss of topsoil.

The Activities Plan must incorporate all necessary techniques to prevent erosion, especially the loss of topsoil and subsoil, during construction, operation and reclamation. Erosion control during the operation and reclamation phases of pits is one of the most important and yet problematic issues that require serious thought during the development and planning stages. Erosion control techniques also require continual updating as new problems are encountered.

Vegetation is one of the most widely used and acceptable methods to control both water and wind erosion.

4.4.2 Dust Control

Dust becomes more of a concern as pit development encroaches on urban and residential areas. Depending on the proximity to populated areas, there may be a need to use ambient monitoring equipment to monitor exposure levels. Dust is defined as a "substance" under the *Environmental Protection and Enhancement Act* and must be controlled so it does not cause an adverse effect.

Contributing factors include excavation of topsoil and other soil resources (e.g., subsoil, overburden), excavation of aggregate, processing of gravel (e.g., crushing, screening, loading, and/or hauling), truck traffic to and from the site causing road dust, movement of heavy equipment on site, and exposed stockpiles.

There are different impacts depending on the size and type of material (clay, for example, is quite fine and contains silicates which may pose more of a health concern than coarser materials such as sand). Impacts from excess dust could include respiratory problems, safety concerns associated with driving, and cleanliness of personal property both indoor and outdoor. Strategies to address fine respirable particulate matter in Alberta are the subject of the Clean Air Strategic Alliance (CASA) *Particulate Matter and Ozone Management Framework for Alberta*. Registration holders should consult the Framework documentation on the CASA web site at http://www.casahome.org/. Click on *CASA Library*, then on *Particulate matter and ozone project team*. As well, registration holders should consult the Canadian Council of Ministers of the Environment website to learn more about the Canada Wide Standard on particulate matter at http://www.ccme.ca/initiatives/standards.html.

It is important to adapt equipment and site operating practices to decrease the amount of dust within a pit. Mitigative efforts could include the following:

- Enclosing crushers to minimize dust levels
- Using fine spray or a misting system on crushing machinery
- Placing a screening system around the crushing equipment and/or on the upwind side of the operation
- Placing crushers in the excavated area (i.e., best to set up equipment in a low area of the pit to decrease exposure; this also has the benefit of reducing noise)
- Paving roads that have intensive or regular use
- Watering down traffic lanes during dry periods to prevent loss of fines due to vehicle movement
- Considering material handling practices and shape of stockpiles (e.g., placement of gently contoured topsoil stockpiles on adjacent agricultural land so they can continue to be farmed during mining operations, allow access on top of stockpile for weed spraying and make them cigar-shaped, facing the prevailing wind)
- Considering wind direction (e.g., move stockpile material from the downwind side and do not have a rough exposed face when working)
- Considering the size and type of equipment for the job
- Developing and implementing contingency plans (e.g., if there are heavy winds and insufficient control measures in place, shut down operations until the dust level subsides)
- Registration holders should consider using dust (particulate matter) monitoring equipment to provide factual information in case of disputes.

4.5 Part 1(f) - Local and Regional Air Monitoring Initiatives

Registration holders should actively search out and participate in local and regional airshed monitoring initiatives, particularly in areas where the local stakeholders consider dust or emissions from equipment or vehicles an issue (for example, the Calgary region has a high level of public interest and concern). Participation may be through the individual company or as a member of an association.

4.6 Part 1(g) - Inactive Pit Plan

The life expectancy of many sand and gravel operations is long-term, but activity may shut down for a period of time once a contract is fulfilled or aggregate is depleted from a portion of the pit.

A plan must be developed for the pit, or portions of the pit, that will be inactive for more than two years. The plan must include the techniques for soil conservation and reclamation techniques that will be used to

- Ensure that the site is safe (e.g., slopes, water bodies, equipment and structures)
- Ensure that soil reclamation materials will continue to be conserved (i.e., protected from erosion and loss) and
- Control weeds

The plan should indicate what monitoring program will be carried out to ensure that the plan is effective.

4.7 Part 1(h) - Scale Drawings of Existing Pit Conditions and Proposed Sequence of Activity

These drawings reflect current conditions and planned operations (the drawings in Chapters 4.16 and 4.17 reflect the final landscape after reclamation). Refer to Chapter 10 for sample drawings. The drawing should be at an appropriate scale and be an appropriate size to clearly show the required information.

The drawings should show the planned sequence of excavation and reclamation for the life of the pit (Part 1(h)(xi)). This is best shown in a time sequence series of drawings. Each drawing should show major activities such as:

- New salvage areas
- New excavations
- New stockpile areas
- New pit water discharge locations
- New water diversion infrastructure
- New groundwater discharge and recharge areas
- Existing and new infrastructure and recent reclamation areas

Each drawing should show the flow of each type of reclamation material (e.g., from salvage to stockpile to placement).

4.8 Part 1(i) - Cross-section Drawings of Existing Pit Site Conditions

Refer to Chapter 10 for sample drawings. The cross-sections should be at an appropriate scale and be an appropriate size to clearly show the required information.

4.9 Part 2(a) - Maximum Pit Size

Pit size includes the total area where aggregate will be removed, any areas where soil will be salvaged and stockpiled, and all the areas described by the term *infrastructure* as defined in the *Activities Designation Regulation.*

The Activities Plan should identify the largest maximum pit size that is likely to occur at the location to reduce the need for amendments to the Activities Plan.

Pit size should be determined through a survey. The survey will assist with developing the site drawings.

4.10 Part 2(b) - Depth to Groundwater

The depth to groundwater in any test holes (Chapter 8.2) must be reported.

4.11 Part 2(c) - Pit Activities

The Activities Plan must indicate if the specific activities listed in Part 2(c) will occur. The Activities Plan should provide details on the location and timing of these activities, and indicate if the location will shift as the pit is developed through time.

4.11.1 Wet Pit Excavation

Pit dewatering typically takes place in operations where the excavation is at or below the water table. Site drainage is maintained by directing pit water (surface runoff and groundwater seepage) to the low point in the extraction area, a sump, a settling pond or offsite to an adjacent waterbody.

Settling ponds should be established in the excavation area to provide containment and settling time for any suspended solids within pit water. They should be constructed so that they are of an adequate size to handle the volume of water coming into the excavation. It is recommended that they be located away from pit activities and riverbanks. Keeping the ponds located away from riverbanks helps ensure riverbank stability.

Sumps are typically constructed for new pits when offsite discharge is not an option and there are no excavations to contain pit water. To provide a reasonable rate of recharge back to the groundwater aquifer, sumps are usually constructed by removing topsoil, subsoil and overburden material from above the gravel in a future mining area. Pit water that is diverted into the sump, quickly infiltrates back into the gravel associated with the aquifer.

Bailing may take place in a wet pit where excavation of aggregate is at or below the water table instead of pit dewatering. In this situation a dragline, clamshell, large hoe or other similar equipment is used to extract the aggregate. Due to high total suspended solids the water contained within the stockpiles from bailing operations should be directed or allowed to run back into the pit from which it was taken; otherwise it must be managed to meet the requirements for release of pit water (Section 4.2.1).

4.11.2 Salt Mixing, Asphalt Mixing and Truck Box Spraying Sites

Asphalt plants, cold mix sites, salt mix sites, truck box spraying sites and bulk fuel storage sites must be located in areas of the pit where topsoil and subsoil have been salvaged. It is recommended that the overburden not be removed from these sites. If overburden material is not present it is recommended that these sites be engineered with a proper liner.

All bulk fuel storage sites must also be constructed and operated in compliance with the most recent version of the *Guidelines for Secondary Containment for Above Ground Storage Tanks*.

By placing these operations in areas where clay overburden is still present or on sites that have been properly engineered, the potential for contaminants to infiltrate through the soil or gravel into the groundwater system is reduced. It also ensures that the material suitable for use as reclamation material is not lost due to contamination.

4.11.3 Aggregate Washing

Typical washing operations include screens to remove large size materials and hydro-separators to wash away silt, clay, soil, organic and other very fine particles from the aggregate. Further screening can be done to separate gravel, coarse sand and fine sand depending on grade of product desired. This system requires settling ponds and a pit water collection system. None of this pit water can be released unless it meets the release requirements in the Code of Practice (Section 4.2.1).

Settling ponds for washing operations should be located on a stable, impermeable foundation with containment features or dykes as needed. It is highly recommended that the clarified water from settling ponds be re-used at the wash plant.

Sludge from the bottom of the settling ponds is typically fine sediment particles such as silt. This material should be considered for use in reclamation. It could be used for establishing grades, slopes or contours, and could also be used as subsoil if suitable. If the material is not suitable for reclamation, it should be placed at the bottom of the pit. This material should not be left in stockpiles where it could be subject to wind or water erosion.

4.11.4 Use of Alternative Reclamation Materials

The two most common reasons why alternative materials may be used for reclamation of the pit are:

- There are inert waste materials that require disposal. These inert waste materials
    - Are most often concrete or asphalt from road projects
    - Should be crushed to prevent movement with frost action and to allow for easier excavation in case the subsurface is disturbed in the future
    - Should be placed at least 1 metre above the seasonally high water table and at least 1.2 metres below the final reclaimed surface
- There are available soil or geological materials from other excavations that would help restore the grade required for the intended land use. In these cases
    - The registration holder should be prepared to provide information showing that the alternative materials have not been contaminated

- The materials should be placed at least 1 metre above the seasonally high water table and at least 1.2 metres below the final reclaimed surface

The Activities Plan should indicate what materials are going to be used, why they are necessary, how much material will be used and confirm that landowner approval has been obtained. The registration holder must document this information.

4.12 Part 2(d) – Mitigative Measures

The Activities Plan must and provide a description of the mitigative measures that will be employed to prevent any adverse effects from the activities in Part 2(c). Common mitigative measures include:

- Implementing spill containment techniques such as dykes, sumps and liners
- Implementing water management plans
- Monitoring success of mitigative plans
- Developing contingency plans
- Developing emergency response plans

4.13 Part 2(e) - Proposed Land Uses

The end land use for the pit should be decided during the planning stage in consultation with the landowner. The decision is based on an assessment of the type of operation, its location and surrounding uses. The end land use for the pit area will usually dictate the sloping requirements.

Local planning and zoning requirements may restrict land use options.

For further information on end land use options the registration holder should consult the document *A User's Guide to Pit and Quarry Reclamation*.

The following list of potential land uses should be used in the response to Part 2(e):

- Cultivation
- Hayland
- Pasture
- Native range
- Grassland
- Forest
- Wildlife habitat
- Water body
- Proposed subdivision
- Other

Where *other* is selected the Activities Plan must provide details of the other land use.

4.13.1 Agricultural Lands

Depending on the location in the province, agriculture land uses could include the production of annual crops, forage crops and livestock grazing, on irrigated and non-irrigated areas. The registration holder should determine if agricultural uses are permitted for the end land use (talk with the municipality, landowner, and/or local reclamation inspector) and plan the reclamation strategy accordingly.

Reclamation should focus on restoring gentle landforms, establishing equivalent drainage and reconstructing an acceptable soil. If the pit is located in an area of high quality farmland (e.g., Canada Land Inventory (CLI) Class 1 to 3 soil capability for agriculture), the expectation is that the land will be returned to an equivalent agricultural capability. In some instances, land that was not suitable for agricultural purposes due to adverse or irregular landforms may be improved through appropriate contouring and/or soil placement.

Land intended for cultivation should not have slopes steeper than 10:1 to avoid topsoil erosion and allow for efficient machinery use. If forage production or pasture is planned, with occasional cultivation for the reclaimed area, the maximum slope should not exceed 6:1. See Chapter 9.2 for the relationship between slopes and CLI classes.

Farmable drainage ditches should have a maximum slope of 10:1 to allow passage of machinery. Terraces, swales and low ridges can be created and used to minimize soil erosion and still allow for unrestricted agricultural use.

Reclaimed land surfaces must be at least 1.0 metre above the seasonally high water table.

Progressive reclamation is recommended during pit operation because it may take two to three years to return the land to an equivalent agricultural capability.

4.13.2 Forestry

A commercial forestry land use is suitable where the adjacent land use is commercial forestry or native forest growth is present. Unless they are connected to other forested land, pit areas that are less than two hectares in size are not suitable for commercial forest production because it is not economical to harvest such a small area. The depth of the pit and reclaimed slope may also limit forest production. Deeper pits may be closer to the water table and poor drainage may limit suitability for the growth of some tree species.

4.13.3 Wildlife Habitat

Reclaiming a pit for wildlife habitat usually involves creating a diverse environment that meets the needs of many species. Rolling, hummocky terrain with random patterns and irregular slopes, edges and contours are more suitable. Habitat should be blended in with surrounding areas. If applicable, care should be taken to maintain or create wildlife corridors so that animals can move safely through the reclaimed area. Revegetation plans should consider the types of wildlife native to the area and their needs (i.e., food, cover, escape terrain and water). Planting a diverse native vegetative cover that matches the surrounding landscape is the best approach.

4.13.4 Subdivision Development

The Activities Plan should indicate if authorization for the proposed development has been obtained from the local authority. If it has not, the Activities Plan should have an alternate land

use available and must provide for the landscaping and soils necessary to implement the alternate land use.

4.13.5 Surface Water Body

This part of the Activities Plan should indicate the intended use of the surface water body (e.g., fisheries, wildlife, recreation, stock watering, etc.). Chapter 4.18.1 describes additional information that must be provided for proposed surface water bodies.

4.14 Part 2(f) - Release of Pit Water

Pit water handling plans may include moving water within the pit (e.g., from excavation to excavation) or discharging off-site via a pipe or a natural drainage. Where the water is retained on-site, the Activities Plan should include a description of the water movement plans.

Where the water is to be discharged off-site, the Activities Plan must describe the conditions that would require release of pit water to the environment, the techniques to release the water and the location of discharge points.

The Activities Plan must include the following information:

- Type of pit water to be discharged (pit dewatering, pit washing, pit runoff, other)
- Volumes to be discharged
- Discharge rates
- Timing of discharge
- The monitoring program to ensure there are no adverse effects of the discharge on the receiving environment
- Contingency plans in case an adverse effect is discovered or the discharge cannot occur

4.15 Part 2(g) - Soil Replacement Depths

Topsoil and subsoil replacement depths must be described in the Activities Plan. These depths may be different for various land uses. If there is more than one land use, the Activities Plan should identify the average replacement depths for each use.

4.16 Part 2(h) - Scale Drawing of Site Conditions After Reclamation

Refer to Chapter 10 for sample drawings. The drawing should be at an appropriate scale and be an appropriate size to clearly show the required information.

4.17 Part 2(i) - Cross-Section Drawing of Site Conditions After Reclamation

Refer to Chapter 10 for sample drawings. The drawing should be at an appropriate scale and be an appropriate size to clearly show the required information. At least one cross-section should go through the deepest part of any surface water body in the reclaimed landscape.

4.18 Part 2(j) - Surface Water Bodies in Reclaimed Landscape

The Activities Plan must provide the following information:

- Design
- Intended use
- Elevation of the water when the surface water body is filled to its design capacity (the full supply level)
- Slope of the land one metre above and one metre below the full supply level

Surface water bodies must only be constructed in areas where there is sufficient natural recharge water (groundwater or surface runoff) available to maintain the design volume of water in the surface water body. If a surface water body does not fill to its designed full supply level a reclamation certificate will not be issued and the registration holder may be required to reclaim the water body to an alternate land use.

Site drainage features that channel surface runoff into the surface water body should be constructed during the re-sloping, contouring and grading phase of reclamation. These features need to be developed, planned for and included in the Activities Plan and the *Water Act* application. Depending on the intended use, landforms such as irregular pond bottoms, islands, contoured banks and mounds, and irregular shorelines should be considered.

4.18.1 Surface Water Body Design

Unless otherwise prescribed in an authorization under the *Water Act*, the following general sloping criteria are suggested:

- 5:1 for a vertical distance of one metre above and one metre below the full supply level
- 3:1 at any elevation below one metre below the full supply level.

For surface water bodies that will only be used for stock watering the following slopes are suggested:

- End slopes flatter than 4:1 and
- All other slopes flatter than 2:1

Registration holders should be aware that these slope recommendations are based on excavations in undisturbed clay soils. There may be problems with slope stability if these slopes are built in disturbed soils. Shallower slopes may be required.

For surface water bodies that will be used for recreation or as wildlife habitat the following design characteristics are suggested:

- Create variety in water depths by developing a contoured base, including some areas above the waterline for nesting and loafing
- Create a varied shoreline with bays
- Provide areas for different types and heights of aquatic plants. Plants are beneficial for filtering water and as cover and a food source (i.e., aquatic insects) for young fish. However, too much growth can lead to water quality and aesthetic problems.

For surface water bodies that will be managed for a fishery the following design characteristics are suggested:

- Steep slopes (2:1 or 1.5:1) to prevent excessive plant growth and predator problems.
- Flat bottoms - variety in water depths may create problems for harvesting or cleaning intensively managed ponds
- Minimum depth of 5 metres
- Continuous aeration year-round to allow fish greater chance to survive summer- and winter-kills.

Registration holders or landowners planning to stock a fish pond will require authorization from Alberta Agriculture, Food and Rural Development, Aquaculture Section (Alberta Agriculture, Food and Rural Development, 1999).

Refer to *A User Guide to Pit and Quarry Reclamation in Alberta* for other information on water body creation in the reclaimed landscape.

5.0 SECURITY

5.1 Full-Cost Security

The purpose of reclamation security is to ensure that the government has access to enough funds that it could reclaim the pit if the registration holder is unable or unwilling to carry out their reclamation obligations. As such, the amount of security provided by the registration holder must be sufficient for the government to hire a third party to carry out the work – this is referred to as full-cost security[25].

Full-cost security is affected by a number of factors, all of which should be addressed in the estimate of reclamation costs supplied by the registration holder. Such factors include, but are not limited to:

- Nature of the pit operation (deep vs. shallow, wet vs. dry)
- Amount and quality of progressive reclamation previously carried out
- Amount and type of reclamation remaining (amount of product to be removed from the site, amount of material to be moved, amount of recontouring required, amount of seedbed preparation required, type of revegetation)
- Presence of any waste materials or contamination on site that will have to be treated or disposed of
- Location of the pit in the province (equipment availability and mobilization costs may vary considerably)
- Type and amount of equipment required, especially any specialized equipment (availability and costs may vary considerably)
- Amount of work required to secure the site for safety purposes
- The need for updated site plans

Full-cost security is required for any lands disturbed under an approval issued pursuant to the *Environmental Protection and Enhancement Act* an any lands disturbed pursuant to a registration.

5.2 Exemptions From Full-Cost Security

Under the *Environmental Protection and Enhancement Act* provincial government Departments are exempt from security requirements[26]. Under the *Conservation and Reclamation Regulation* local authorities such as municipalities are exempt from security requirements[27].

Under the *Conservation and Reclamation Regulation* registration holders who disturbed land pursuant to an approval issued under the *Land Surface Conservation and Reclamation Act* are

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[25] *Conservation and Reclamation Regulation* s 18(1)

[26] *Environmental Protection and Enhancement Act* s. 84

[27] *Conservation and Reclamation Regulation* s 17.1

required to provide security at $250.00/acre for that disturbed area[28]. This flat rate for security calculations was established over twenty years ago, based on standards in effect at the time. This flat rate does not reflect actual reclamation costs. However, it is all that is required under the Regulation. Registration holders must clearly identify location and size of the lands covered by the security under the *Land Surface Conservation and Reclamation Act*.

Land that was disturbed prior to August 15, 1978 and has not been disturbed since by pit operations, and will not be disturbed by the current or future pit operations, is not considered part of the pit and therefore does not require security.

5.3 Calculating Security

Applicants or registration holders must provide the Director with the information required in Schedule 3 of the Code of Practice, including an estimate of the cost of reclamation for their site. The registration holder must be able to clearly explain how their estimate was developed (e.g., volumes of material to be moved and contoured, site preparation for revegetation, revegetation materials, etc.) and what information was used to develop it (e.g., equipment rates). The Director must be satisfied that the estimate provides the coverage required by the Regulation.

The following information would likely provide the Director with enough information to accept an estimate. Other methods are acceptable but must be clearly documented. Applicants and registration holders are encouraged to discuss alternate methods with the Director before completing the estimate.

(a) the area (expressed in acres) and location of lands disturbed pursuant to an approval issued under the *Land Surface Conservation and Reclamation Act* for which security has been submitted at $250/acre

(b) a detailed calculation of security that would represent the maximum conservation and reclamation cost incurred by a third party to reclaim the portions of the pit, except those described by (a), to equivalent land capability at any time within the next five years, including, at a minimum

  (i) a list of each type of equipment required to move or place overburden, reject material, subsoil, topsoil, or alternative reclamation materials at the pit

  (ii) unit operating costs ($/m^3 or $/hr or $/day) for each piece of equipment in (i)

  (iii) the volumes of each type of material to be moved or placed in (i), expressed in m^3

  (iv) the hours or days to move or place the materials in (i) if the unit operating costs in (ii) are expressed in $/hr or $/day, respectively

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[28] *Conservation and Reclamation Regulation* s 18(3)

(v) the unit costs (per acre or hectare or hour or day) for landscape grading prior to placing subsoil or topsoil, including but not limited to sloping and surface water body construction

(vi) the unit costs (per hectare or acre or hour or day) for seedbed preparation, including but not limited to soil decompaction and fertilizer placement

(vii) the unit costs (per hectare or acre or hour or day) for revegetation, including but not limited to the cost of seed or other vegetative materials and the equipment to plant the seed or other vegetative materials

(viii) the number of hectares or acres or hours or days subject to (v), (vi) and (vii) in the estimate

(ix) the cost to remove and properly dispose of infrastructure

(x) administrative costs to manage the reclamation activities at the pit, develop a revised reclamation plan and manage the removal of any product stored at the pit

(c) documentation of the sources used to

(i) determine the unit costs in (b) (ii), (v), (vi) and (vii), and

(ii) determine the costs in (b) (ix) and (x)

When developing the cost data for (b) the registration holder may divide the site up into logical units and develop separate costs for each unit. For example, there may be different equipment used for moving and placing a stockpile that is at the bottom of the excavation versus one that is located outside the excavation so each stockpile could have its own cost estimate.

The estimate should be accompanied by a scale drawing that shows the pit at the time used to calculate the security estimate including the location of

(i) the pit

(ii) any access road(s)

(iii) any structures or equipment

(iv) any extraction and processing area(s)

(v) any stockpile areas

(vi) any surface water bodies

(vii) the legal boundaries of the parcel or parcels of land on which the pit is or will be located

5.4 Calculating Security on Transfer of a Registration

A new registration holder must provide security prior to a transfer becoming effective. Security will be calculated based on full-cost security. Because there is a new registration the $250/acre security rate no longer applies.

5.5 Form of Security

The most common forms of security provided for pits are:

- Letters of Credit – registration holders should contact the Security Administrator[29] to determine the specific format of the Letter of Credit
- Cash – interest on cash security accrues to the registration holder in the security account.

The *Conservation and Reclamation Regulation* provides for other forms of security that the Director may consider[30]. Registration holders should contact the Director to determine if an alternative form of security is possible.

5.6 Renewal of Security

The Code of Practice requires the registration holder to renew security every five years at a minimum. Registration holders may at any time submit a new reclamation security estimate if they have reduced the site liability by carrying out reclamation. The Director may require a new estimate and new security if the Director believes the current security does not adequately represent the liability at the site.

5.7 Forfeiture of Security

Security may be forfeited when the registration holder refuses to comply with an environmental protection order or an emergency environmental protection order for conservation and reclamation[31]. The Department will use the forfeited security to carry out the conservation and reclamation of the site.

Where the amount of the forfeited security is in excess of the amount required to complete the conservation and reclamation the excess amount will be returned to the registration holder[32]. Where the amount of forfeited security is insufficient the registration holder remains liable for the balance of the costs[33].

Where security is provided by a Letter of Credit and the Director is of the opinion that the Letter of Credit is not going to be renewed before it expires the Director my realize upon the Letter of Credit (i.e., convert the Letter of Credit to cash). The registration holder may decide to retain the security in the form of cash or, upon providing a suitable replacement Letter of Credit, the Director will return the cash.

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[29] Alberta Environment, Regulatory Approvals Centre, 1st Floor, 9820 – 106 Street, Edmonton T5K 2J6 (780) 427-9541

[30] *Conservation and Reclamation Regulation* s. 21

[31] *Conservation and Reclamation Regulation* s. 24(1)

[32] *Conservation and Reclamation Regulation* s. 24(5)

[33] *Conservation and Reclamation Regulation* s. 24(6)

5.8 Return of Security

Security is returned to the registration holder in two ways:

- Land that has been partially reclaimed by the registration holder would cost less to reclaim and therefore results in a lower security estimate. Land that has been certified does not enter into the security estimate. Registration holders who carry out progressive reclamation will face a lower security burden than a registration holder who waits until the end of the pit's life to reclaim.
- The security is no longer required when the pit is fully reclaimed and certified.
    - Where a Letter of Credit is the security instrument the Letter of Credit is cancelled.
    - Where cash is the security instrument, the remaining cash and any accrued interest is returned to the registration holder.

If a pit is fully reclaimed security will still be retained until the full site has received a reclamation certificate. The minimum amount of security will be based on an estimate supplied by the registration holder for the cost of reseeding the entire site. This final amount of security will be returned when the reclamation certificate is issued.

6.0 ADDITIONAL PLANNING GUIDANCE

This Section provides guidance on additional information that should be considered during the planning phase. The more information that is collected, considered and incorporated into the Activities Plan the greater the chances for successful pit operation.

6.1 Inventories

Conducting the following inventories prior to developing the Activities Plan will be helpful:

- A pre-site assessment is very important for identifying existing conditions on the area proposed for pit development. Since a registration holder assumes all reclamation liability from previous pit activities, it is advisable to do a thorough examination of air photos and a ground inspection.
- Information from all previous registration or approval holders should be reviewed. Local residents, municipal authorities and Albert Environment staff may be able to provide information about historical uses.
- Local land use zoning regulations and permits should be reviewed to determine current land use and permitted post-reclamation land uses.
- Slope classes, soil and landscape capability ratings, wildlife habitat suitability indexes and other such indicators of current and future land use potential will help develop and defend plans.
- The vegetation on and around the site should be examined to determine if weed problems exist that may require control prior to excavation. Check with the municipality to determine if any of the weeds in the *Weed Control Act* have been upgraded locally to a noxious or restricted status. The landowner should be informed about the weed survey and allowed to sign an agreement stating that they are aware of the contents of the report. This can prevent potential conflicts later over the origin of weeds.
- An onsite inventory of vegetation species by a qualified vegetation specialist helps in revegetation planning. In most cases, the species used to revegetate the disturbance are the same species that were present prior to disturbance. Exceptions include creation of wetlands that may require introduction of different vegetation adapted to wetter conditions.

6.2 Undisturbed Buffer Zones

Buffer zones of undisturbed vegetation of varying widths are usually needed around pit operations. Undisturbed buffer zones are placed for safety, to prevent erosion and siltation into watercourses, to reduce noise and dust, to provide wildlife corridors or for aesthetic reasons.

A three metre undisturbed buffer zone from all property lines to the edge of the disturbance is recommended. Other buffer widths vary depending on what is being protected (e.g., roads, pipelines, residences). Some buffers may be specified in Acts, regulations or authorizations.

Undisturbed buffer zones should be clearly indicated in the Activities Plan drawings.

6.2.1 Undisturbed Buffer Zones Adjacent to Rivers and Water Bodies

Undisturbed buffers are strongly recommended between pits and adjacent rivers and water bodies. Undisturbed buffer zone widths should be site specific and will need to be determined by a professional engineer, however, there are some general guidelines that can be used. The recommended setback distances are 30 metres from river sections that are relatively linear and 60 metres from river sections located on the outside of river bends, particularly if the bank of the river is actively eroding.

These buffer zones are recommended to ensure an undisturbed, vegetated buffer strip between the operation and an adjacent river or water body. Vegetated buffers are important for:

- Maintaining stability of slopes thereby reducing bank erosion, the potential for lateral shifting and stream degradation
- Helping protect private land from flooding and potential loss of land due to erosion and instability
- Aiding in preventing the loss of product and soil material that maybe suitable for reclamation (e.g., as a result of flood events)
- Reducing potential of erosion and siltation into the water body thereby reducing the loss of potential fish habitat
- Intercepting runoff and acting as a filter for sediment and pollutants, thereby reducing the amount introduced to the water body

The width of the undisturbed buffer zones should be measured from the top of the active bank of the river or water body. These buffers should be identified on the Activities Plan and surveyed clearly and permanently marked in the field prior to any activity on the site commencing.

6.2.2 Extraction Setbacks

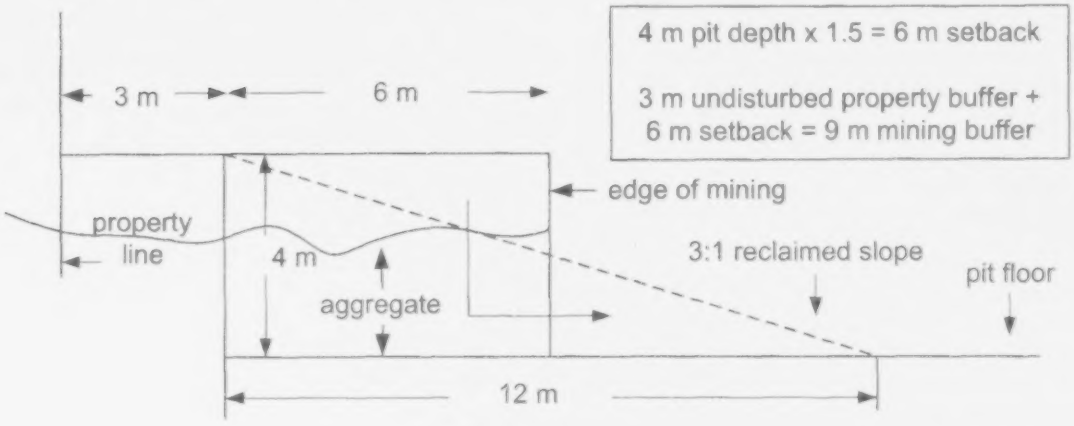
Extraction setbacks from all boundaries and undisturbed buffer zones should be included to ensure that adequate material is available to meet the sloping requirements in the Activities Plan. Once the extraction setback is calculated, it has to be added to the undisturbed buffer zone adjacent to the property line to determine the excavation limit.

For example

> The extraction setback should be equal to the average depth of the pit multiplied by 1.5 for property boundaries where a 3:1 slope is to be established (see Figure 3). This allows for maximum resource development while maintaining a stable slope that can be revegetated with relative ease.
>
> For a pit with an average depth of four metres, the extraction setback would be four metres x 1.5 = six metres.
>
> The distance from the actual property boundary to where the mining must stop would be three metres (recommended undisturbed buffer adjacent to the property line) plus six metres (extraction setback) = nine metres.

During reclamation, the material left in this extraction setback is used to establish a 3:1 slope starting from the edge of the three metre undisturbed buffer and running to the pit floor.

Figure 3. Extraction Setback Example



For situations where flatter slopes are required adjacent to undisturbed buffer zones, the extraction setback distance has to be increased or other suitable material has to be available to construct the required slopes. Normally, slopes associated with property boundaries and undisturbed buffer zones are not required to be compatible with adjoining land uses or CLI classes. Stability and re-vegetation are the main concerns in these areas of the pit.

Excavation of aggregate within the calculated extraction setback can be undertaken if there is sufficient overburden material available in the pit to create the required slope and the excavation would not result in stability problems at the pit face. Operations should be conducted in a manner that allows for rapid overburden placement to reduce the potential for collapse of the pit face.

Undisturbed buffer zones and extractions setbacks are not required at property lines if the excavation will continue across the property line. Registration holders should make every effort to maximize the extraction of aggregate resources by working with landowners, municipalities (for road allowances) and adjacent pit operators.

6.2.3 Unstable Areas

A geotechnical assessment or evaluation may be necessary in areas where stability is a concern. Slumping, particularly along valley breaks, can be evidence of stability problems. This may be an important consideration for the safety of operations in some areas. Undisturbed buffer zones from the top of valley breaks or similar features will need to be determined based on the stability of soil and geological materials.

6.3 Depth of Excavation

As sand and gravel pit depths are variable, the Activities Plan should indicate the anticipated maximum depth (from the original surface to the deepest extraction depth) for the pit. A proper review of the subsurface information provides an inventory of the aggregate to be removed.

The depth of the pit relative to the remaining land surface may influence choice of end land use. Shallow pits less than three metres deep can provide suitable sites for almost any land use, with the exception of fish habitat. Moderately deep pits with depths of three to seven metres can provide opportunities for wildlife habitat, fish habitat and recreation. Pits more than seven metres in depth are likely to be suitable only for wildlife or fish habitat, unless substantial re-contouring is included as part of the pit development plan.

6.4 Sensitive Areas

There are a number of landscapes and site types that are highly sensitive and need to be given special attention during the planning, operating and reclamation phases of a project. Mitigative action aimed at protecting and conserving these resources should be addressed in the Activities Plan.

Some particularly sensitive landscapes and features should be avoided. These include lands adjacent to and within: water-bodies, wetlands, coulees, river valleys, and dry lakebeds. Lands that have rare landforms, rare plants or plant communities, and listed endangered wildlife species and important wildlife areas are also sensitive to development. Where avoidance is not practical, alternative construction techniques and equipment and appropriate timing windows should be considered.

6.4.1 Water Body, Valley and Coulee Protection

Pit location and operations should be designed to avoid disturbing valley and coulee edges and water bodies. Disturbance in this context includes excavation of valley and coulee walls (daylighting) and disposal of soil or geological material into valleys and coulees.

6.4.2 Rare Species

A rare species is any native species that, because of its biological characteristics or its occurrence at the edge of its range, or for some other reason, exists in low numbers or in very restricted areas. Rare plant species or rare plant communities for Alberta include those listed on the current Alberta Natural Heritage Information Centre (ANHIC) (www.gov.ab.ca/env/anhic) tracking list (ANHIC, 2000; Allen, 2001) and may include those listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (www.cosewic.gc.ca). At a minimum, ANHIC should be contacted (780 427-5209) to determine if any rare species have been located in the project area.

If the proposed pit is situated in a natural landscape, particularly a coulee, river valley or other unusual landscape, a rare species survey should be conducted. Guidelines on how to conduct a rare plant survey are located on the Alberta Native Plant website (www.anpc.ab.ca).

6.5 Wildlife Considerations

Regional and local differences exist in the types, distribution and abundance of wildlife. It is important to know what wildlife exists in the pit development area and how the species are likely to respond to conditions in the reclaimed area. Evidence of wildlife could include tracks, droppings, nests, and browsed trees or shrubs.

In the prairie grassland region, wildlife habitat (representative species include pronghorn antelope, white-tail deer, and sharp-tailed grouse) in coulees, watercourses and other depressions is vitally important. Due to the large number of wetlands and the mixture of open and forested areas, the aspen parkland is an extremely important area for wildlife, particularly waterfowl (species include mule deer, sharp-tailed grouse, and red squirrel). The boreal and foothills regions support a diversity of wildlife due to the large area of forested habitats. Species include mule deer, moose, sharp-tailed grouse, snowshoe hare, elk, and spruce grouse.

Adjusting timing of construction or reclamation activities to less sensitive periods during the year is common practice to avoid breeding or spawning times for wildlife and to minimize disturbance to native vegetation and habitat. It is important to consult with local wildlife biologists to determine the best times to construct without undue disturbance to wildlife populations. Construction during breeding times is usually restricted. Appropriate buffer zones allow animals to continue movement from one area to another without being exposed.

6.6 Equipment Type

The type of equipment used for pit operation depends on size of the proposed operation, the need for extraction and processing, and the local availability of equipment. Every effort should be made to:

- Use equipment that is suited to the size of the job
- Use equipment that has the least possible impact on the land
- Select equipment to perform the work with consideration to productivity, safety, and cost effectiveness
- Have contingency plans when different equipment is required due to changes in site conditions (i.e., low ground pressure equipment if the area is or becomes too soft to salvage surface soils)
- Use an equipment operator who understands conservation and reclamation requirements be selected

6.7 Urban and Rural Residential Areas

Urban and rural residents have a number of concerns related to the development of pits near their homes, including environmental issues such as groundwater protection, dust, and final reclamation plans, and non-environmental issues such as truck traffic and hours of operation. Registration holders should engage local residents early in the planning process to describe the operating plans and environmental protection measures that will be employed, including the final reclamation goals for the pit. This communication should be continued throughout the development and reclamation of the pit.

6.7.1 Noise

Noise is a particular concern for residents. Noise contributors in pit operations include heavy trucks, vehicles, machinery (crushers, screeners, backhoes, etc.), conveyer systems, open-pumping systems for water activities, and generators.

If proper sound control features are incorporated into facility design in the planning stages, increases in sound levels can be kept to acceptable minimums. Methods to reduce the amount of noise generated on a site could include the following:

- Suppression by enclosure of pumps or other systems
- Enclosure of crushers (e.g., use of a blanket system around the outside of a plant to absorb sound)
- General restriction on operations (e.g., reduce or restrict the use of engine retarder brakes and reduce the amount of heavy gearing)
- Selection of equipment that has taken noise reduction into account
- Consideration of equipment siting (e.g., crusher set up in low areas, use of stockpiles as sound barriers, and operational design of pit)
- In instances where pit operations are close to residential areas, the use of sound monitoring equipment is encouraged to provide factual information in case of disputes.

6.7.2 End Land Uses

Reclaimed pits in close proximity to cities and towns are often developed for intensive uses (i.e., residential or commercial light industrial developments, parks, golf courses, or sports complexes) but zoning changes may be required. On the periphery of urban centres, less intensive uses such as country residential, wildlife habitat, fish habitat and nature-oriented recreation are possibilities. Sites in rural areas may be better suited for farming, wildlife habitat and/or fish habitat.

7.0 ADDITIONAL OPERATING GUIDANCE

The following information provides guidance on planning and conducting pit operations. The more information that is collected, considered and incorporated into the Activities Plan the greater the chances for successful pit operation.

7.1 Sequence of Operation

Operations should be planned to efficiently extract the resource and progressively reclaim the pit. To achieve progressive reclamation, the sequencing for pit development has to be planned to free resource depleted areas of continued activities (see the sample drawings in Chapter 10). Progressively developing and reclaiming the pit should minimize double handling of topsoil, subsoil, overburden, and/or aggregate. Extracting and processing materials only when they are required can also reduce materials handling.

Once a development stage is completed, overburden and subsoil can be directly placed into depleted pit areas to achieve the contour grade for reclamation. Salvage and direct placement of topsoil promotes better plant cover and serves as a source for native seeds and plants. Pit development and reclamation becomes a sequential process, minimizing the reclamation liability.

7.2 Shutting Down Operations

In the event of wet or partially frozen conditions, construction and equipment travel should be suspended until conditions improve in order to minimize terrain disturbance and soil structure damage. Indicators of wet conditions may include rutting, wheel-slip, build-up of mud on tires and cleats, formation of puddles, and tracking of mud on the site as vehicles leave the working area. Topsoil handling should also be suspended during excessive wind conditions to prevent soil erosion. A clear shut down protocol should form part of the registration holder's internal operations manual.

The registration holder should immediately suspend the salvage or replacement of any topsoil or subsoil when:

- Wet or frozen field conditions would result in the degradation or loss of topsoil or subsoil
- Wind velocity creates the potential for loss of topsoil or subsoil
- Any other field condition or construction method could result in the degradation or loss of topsoil or subsoil

The registration holder should only restart the salvage or replacement of topsoil or subsoil when the conditions specified above no longer exist.

7.3 Soil Conservation

Conservation of topsoil and subsoil is required under the *Environmental Protection and Enhancement Act*[34]. The Activities Plan must outline how these materials are salvaged, handled, stored and used for reclamation.

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[34] s. 1(l) and 137 of the *Environmental Protection and Enhancement Act*

7.3.1 Topsoil Salvage

Topsoil is the thin layer of soil covering the earth that is essential for plant growth. It is generally considered to be irreplaceable. A topsoil depth survey should be carried out and a topsoil depth and distribution map should be prepared to guide the salvage operations in the field.

Topsoil must be salvaged from all areas of the pit that will be disturbed by pit operations. The only exception is that topsoil does not have to be salvaged from areas where topsoil stockpiles will be located.

Topsoil should be salvaged at least five metres ahead of all pit faces to ensure that topsoil does not slough into the pit. The salvage distance should be greater if the pit face is unstable or is rapidly advancing. The distance may be shortened near undisturbed buffer zones to maximize aggregate salvage but extra care should be taken to ensure no loss of topsoil.

Topsoil salvage should be carried out when the ground is not frozen. It is very difficult to salvage topsoil separately from the underlying subsoil or overburden when the near-surface soils are frozen.

7.3.2 Subsoil Salvage

Subsoil is the soil material found beneath the topsoil but above overburden or bedrock (usually the B horizon). It must be salvaged from excavation areas after the topsoil has been removed. Subsoil should be salvaged at least three metres ahead of the pit face to reduce loss into the pit.

Subsoil is replaced in the pit after operations have been completed. If overburden or other materials are not available, subsoil may be used for site contour development.

7.3.3 Overburden Removal

Overburden is the soil or bedrock material found at a pit below the subsoil and above the aggregate. Overburden should be removed and retained for site contour development during reclamation.

7.3.4 Stockpiles

Excess aggregate is stockpiled when demand for the aggregate resource is not especially high, or when more aggregate is extracted than can be used for a specific project. Reclamation materials need to be stockpiled when a pit is first opened up and may have to be stockpiled when direct placement is not possible. Approximate areas required for long-term topsoil, subsoil and overburden stockpiles can be determined based on the estimates of initial stripping volumes.

Materials from the initial site preparation are often stockpiled for the duration of the operation and then used in reclaiming the last operating area on the property. To minimize erosion potential and cut down on weed growth, these stockpiles should be seeded with appropriate vegetation (often annual crops such as oats, barley or rye). There is also the option to gently contour topsoil stockpiles so they can be integrated with the adjacent farming operations, however care must be taken over time to ensure that the material is recorded and understood to be a stockpile rather than "adjacent land".

In addition to the requirements in the Code of Practice, the following points should also be taken into consideration when determining stockpile location and design to improve chances of conservation and reclamation success and reduce cost of reclamation security.

- Topsoil stockpiles should not contain any large roots or stumps
- Thin, vegetated topsoil stockpiles (one to two metres in depth) tend to maintain topsoil quality better than thick piles
- Topsoil, subsoil and overburden stockpiles should be contoured to allow for vegetation and stabilization as well as easier weed control
- If possible, topsoil, subsoil and overburden stockpiles should not be located over merchantable aggregate
- The stripped surface of the stockpile site should be smoothed and properly sloped to make a firm, well-drained base
- Drainage around stockpiles should be provided to prevent collection and blockage of surface run-off
- Stockpiles should be located in a secure area away from travel areas and day-to-day operations
- Stockpiles should not be constructed near road allowances, lease boundaries or utility rights of way where slumping could cause personal injury or property damage
- Stockpiles should be placed where they are easily accessible for loading material into trucks
- Stockpiles should be located so that they do not have to be re-handled (e.g., locate storage sites in areas that will not be disturbed by the mining operation) and do not interfere with future pit expansion
- Stockpiles should be oriented so they do not create safety hazards for traffic, such as blind corners or dangerous access
- Stockpiles of reject and waste materials from asphalt and concrete or cement production should be located so that they do not come in contact with surface water or groundwater
- Use of silt fences, tackifiers, mulches, tarps, or erosion control products may help prevent erosion and prevent sediment (as a result of water erosion) from leaving the site

7.4 Drainage

Drainage control is important in both the operation and reclamation phases to minimize erosion, soil loss and sedimentation resulting from overland and channel flow through reclaimed areas, to control flooding or ponding, and to minimize obstacles to farming equipment. It is very important during both the operating and reclamation phases that the pit operations do not divert, block or impound the natural surface or subsurface drainage.

The Activities Plan should document methods to re-establish and control drainage (e.g., interceptor drainage and grassed waterways to slow water velocity). Temporary diversion of drainage away from newly topsoiled and seeded areas to prevent erosion should also be

considered. The Activities Plan should also describe methods to ensure that surface runoff from the pit during the operation phase does not flow onto adjacent properties. Directing runoff and groundwater seepages to sumps or low points in the pit to allow for later disposal or seepage is one method that can be used.

7.5 Soil Replacement

The registration holder should focus on progressive reclamation throughout the life of the pit to reduce stockpile volumes and the amount of active area within the pit. The goal for soil replacement should be replacement of salvaged soil material so that soil depth and quality are equivalent to the original or representative of the adjacent undisturbed land. Where end land use changes, soil depth and quality may vary from the original condition.

7.5.1 Sequence

Replace salvaged topsoil, subsoil, overburden, and reject material in the proper sequence.

- During replacement, poor quality materials should be directly placed into the pit
    - Poor quality overburden (saline, very stony), reject material and fine sediments should be replaced first and covered by at least 1.2 metres of better quality material so the rooting zone is not impacted
    - Coarse materials should be buried at the bottom of the pit or used for slope reconstruction
    - Placing reject and other poor quality reclamation materials in their desired final destination avoids costly re-handling
- In most cases, overburden should be spread evenly across the site and used for site grading and re-contouring.
    - It is recommended that overburden be directly replaced into depleted portions of the pit. The placement of this material should be done so that it supports the final land use for the site
- Salvaged subsoil should be replaced evenly over the overburden or reject material and can be used for minor re-contouring. In agricultural areas, the subsoil surface should be worked to break up lumps and to level ridges and depressions prior to topsoil replacement. In natural environments (e.g., forests or native range), leaving a rough surface may facilitate the development of diverse vegetation by creating microsites for seed germination and establishment.
- Topsoil replacement should occur after contouring is complete and subsidence is no longer a concern
    - In agricultural areas, topsoil should be replaced as evenly as possible across the site but not in areas below the water table.
    - In natural environments, such as forests, it may be preferable to have uneven thickness of topsoil to increase diversity on the site.

- In water bodies, a thin layer of topsoil within the littoral zone[35] will help establish aquatic vegetation.

The registration holder should minimize machine traffic on the topsoil and not work it when it is wet. Replaced topsoil should be protected from water and wind erosion by leaving some surface roughness and establishing appropriate vegetation cover.

7.5.2 Decompaction

The following should be given consideration to reduce compaction on reclaimed sites to ensure an adequate rooting zone of at least 1.5 metres

- Reducing the amount of equipment traffic on levelled areas and operating only during dry conditions.
- Replacing overburden in thick (one metre) lifts should help to reduce compaction on a site.
- Decompacting the replaced and contoured overburden before replacing topsoil and subsoil.
- Tilling subsoil if necessary with appropriate equipment to break larger soil clods, prior to topsoil replacement.

If compaction does occur, ripping can help improve soil conditions by breaking up the surface of the overburden, increasing infiltration of surface water, and creating a better root zone. Subsoilers can be used to relieve compaction in the subsoil after topsoil has been replaced, without mixing soil layers. Subsoiling can be beneficial if completed under the right conditions and followed by proper management. Factors to consider include soil texture, soil moisture, equipment type, equipment speed, and subsequent vegetation management. Heavy or wet soil, for example, may not fracture as expected and could likely re-compact. Operating equipment too fast or too slow may cause the same result depending on the soil and moisture conditions. Before any effort is made to use a subsoiler, experienced personnel should be present to monitor and supervise the work and make adjustments as deemed necessary. The subsequent management depends on the soil, its organic content, and climatic conditions.

7.6 Revegetation

Plant species should be matched to the chosen end land use or to species present on adjacent land. Landowners must be contacted to determine their preferences.

It is extremely important to use weed free materials. It is not sufficient to purchase "certified seed". Seed analysis should be conducted on all seed by a recognized laboratory. A Certificate of Seed Analysis should be obtained for each seed lot (prior to mixing) and examined to determine if there are any problem weeds in the seed. Agricultural fieldmen can be contacted about specific weed concerns in local municipalities.

The *Native Plant Revegetation Guidelines for Alberta* (NPWG, 2001) should be consulted during the planning phase if revegetation plans require use of native species. Species lists for various

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[35] The littoral zone is often defined as the area of a water body where the water depth is less than one metre

areas and site types in Alberta can be found in *A Guide to Using Native Plants on Disturbed Lands* (Gerling et al., 1996).

7.6.1 Weed Control

The registration holder is the "occupant" as defined in the Alberta *Weed Control Act* and is responsible for the spread of any weed seeds. Under this legislation all restricted weeds must be eliminated, all noxious weeds must be controlled, and the spreading or scattering of nuisance weeds should be prevented.

Advice on types of problem weeds and weed control can be obtained from the local municipality, Agricultural Fieldman, Farmer's Advocate, Alberta Environment inspector, or District Agrologist. The Activities Plan should include methods for controlling and eliminating weeds associated with operating and reclaiming the pit. Methods to prevent the introduction of weeds to a site and facilitate weed control during construction, operation and reclamation of a pit could include the following:

- Determining the weed history and weeds of concern in the area (e.g., conducting a pre-construction weed survey so contaminated areas can be avoided during, or treated prior to, construction)
- Preventing initial weed establishment
- Pressure cleaning construction and reclamation equipment before it is brought onto a site to minimize seed spread
- Developing an active weed control program during operation of the pit
- Keeping soil stockpiles as close to the original location as possible
- Seeding stockpiles to grasses or legumes to reduce weed growth (e.g., use species that provide erosion control and are competitive with weeds)
- Monitoring land for new weed outbreaks and spot spraying, mowing or hand pulling weeds to save money in the long run (mowing is preferred to spraying for weed control on prairie sites)
- Mowing to control weeds prior to flowering so weed seeds are not spread.
- Mowing areas seeded to native species high enough (15 centimetres above surface grade) to avoid damaging established native seedlings
- Appropriately using herbicides during pit operation (determine if herbicide use is allowed in the area and if so, read mixing and application instructions carefully)
- Not importing topsoil with weeds
- Use soil from the immediate area where required (talk to the landowner)
- Requesting a Certificate of Seed Analysis for each seed lot to determine weeds or "undesirable species" in the seed mix and checking with regulatory personnel to determine if any species of concern are present

8.0 SUMMARY OF LEGISLATION

Disclaimer: Readers should be aware that this is an incomplete list and that they are responsible for ensuring compliance with all applicable legislation whether listed and discussed in this Guide or not.

8.1 Environmental Protection and Enhancement Act

The *Environmental Protection and Enhancement Act,* with its associated regulations came into force on September 1, 1993. The *Activities Designation Regulation* and the *Conservation and Reclamation Regulation* were amended in 2004 to allow the introduction of the *Code of Practice for Pits*. Prior to this regulatory change, pits greater than or equal to 5 hectares on private land required an approval and submission of security.

All pits in Alberta are required to comply with the Act and its associated regulations regardless of size. Of particular interest to pit operators are the following regulations:

- *Conservation and Reclamation Regulation* – regulates conservation and reclamation of specified land, including pits and requires compliance with the Code of Practice
- *Activities Designation Regulation* – identifies activities that require approvals or registrations under the Act (pits will move from approvals to registrations)
- *Release Reporting Regulation* – identifies the content and format of substance release reports
- *Waste Control Regulation* – identifies requirements for waste disposal and exempts certain materials as waste when used for reclamation
- *Environmental Assessment (Mandatory and Exempted Activities) Regulation* – identifies activities that are either mandatory EIAs (pits are not) or are excluded from the EIA process (pits less than 5 acres or 2 hectares are exempt)

8.2 Water Act

The *Water Act* was proclaimed on January 1, 1999 and consists of the Act and its associated regulations and Codes of Practice. The *Water Act* supports and promotes the conservation and management of water including allocation and wise use. It outlines the requirements for approvals, licenses, temporary diversion licenses, water allocation and transfers.

Water Act approvals related to pit activities and diversions are generally obtained either by the pit registration holder or by the landowner. Landowners generally obtain the approval when the activity involves a permanent diversion of water. However, the pit registration holder can obtain the approval with the consent of the landowner. If the pit requires an approval under the *Water Act*, pit registration holders must understand that the application requires public notice unless it is waived[36]. Requests to waive the public notice are reviewed and approved on the individual merits of each request. If the public notice is waived, then notice of the decision must be

[36] *Water Act* s 108(6)

provided[37]. Sample *Water Act* application forms can be found on the web at http://www3.gov.ab.ca/env/water/Legislation/Forms/Index.html.

Pit operations have the potential to affect surface water and groundwater on the site and off the site. The impacts of these activities off the site may affect adjacent landowners and water users. Pits may require an authorization under the *Water Act* or may be required to follow a Code of Practice when:

- Water is used or diverted (e.g., gravel washing, pit dewatering, diversion of watercourses or surface water flow)
- The pit is within the floodplain of a watercourse or water body
- Structures, such as roads, bridges, culverts, outfalls and erosion protection are being constructed on watercourses or water bodies
- Water bodies[38] such as wetlands (permanent or temporary) are or may be affected by pit operations
- Drainage courses will be modified, controlled or diverted
- Surface water bodies[39] are planned as an end land use

8.2.1 Exemptions

Pit registration holders should be aware that their activity may be exempt from requiring a *Water Act* authorization. This is only the case if the proposed activity or diversion falls into one of the exemption categories in the *Water (Ministerial) Regulation*. For example, the following is exempted under Schedule 3 of the *Water (Ministerial) Regulation*

(f) a diversion of water for the purpose of dewatering a sand and gravel site or construction site if

(i) the water diverted as a result of the dewatering is

(a) moved into and retained in an on-site pit, without using the water, or

(b) diverted back into a water body without using the water, if the water is equal to or of the same quality as the water that was originally diverted

(ii) the dewatering site, the water body and the on-site pit referred to in subclause (i) are hydraulically connected

(iii) there is no adverse effect on the aquatic environment or on a household user, licensee or traditional agriculture user

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[37] *Water Act* s. 111(2)

[38] *Water Act* s. 1(1)(ggg) defines a **water body**. Registration holders are encouraged to contact Alberta Environment if there is any question about whether or not a particular body of water is considered a water body under the *Water Act*

[39] The definition of **surface water body** is slightly modified in the Code (s. 1(u)) from the *Water Act* definition. Also commonly known as an end-pit lake.

Pit registration holders can contact the local Alberta Environment office for further information on *Water Act* approvals.

8.2.2 Aquifers and Groundwater

Under the *Water Act*, aquifers are considered water bodies and an authorization may be required for any activities that may affect the aquifer, such as the hydraulic characteristics and water availability of the aquifer. Pit registration holders must take extra precautions where the operations may impact an aquifer. More information on aquifers is available through Alberta Environment's Ground Water Information System Web Site at http://www3.gov.ab.ca/env/water/groundwater/index.html.

Through this system you can view the information from the original water well driller's report received by the Groundwater Information Centre (GIC). You can also print individual records and print the overlaying map(s) that show the wells in relation to other wells and roads, etc. From the site listed above you can access a GIS database of drilling reports. The database also contains information about individual water well reports, chemical analysis reports up to the end of 1986, springs, flowing shot holes, test holes, and pump tests conducted on the wells.

Obtaining background groundwater data is important for the planning, operating, and reclamation phases of pits. Steps to take include:

- Determine if pit operation is on a known aquifer. Information may be available from Local Municipalities, Alberta Environment, Prairie Farm Rehabilitation Administration offices or local community organizations such as the Grimshaw Gravels Aquifer Advisory Committee. Digital information may be available from the Prairie Farm Rehabilitation Administration for aquifers south of Edmonton, and from the Groundwater Information Centre.
- Obtain groundwater quality and quantity information prior to operating a pit on an aquifer, and retain the information on file. If authorization under the *Water Act* is required, a field verified survey of groundwater users might be required. The survey should include the location and ownership of all wells, springs or dugouts within a specified radius (usually one mile) of the proposed operation. The survey includes water quality, well depth, depth to water, completion details (i.e., screened, open or slotted interval) and pump intake depth for each well. A map should be created to show the locations of the wells identified in the survey. This information is useful in protecting both the registration holder and the adjacent users if conflicts arise over water contamination or water use. The information may also require periodic updating.
- Ensure that above ground fuel storage tanks, asphalt plants and salt mixing sites are appropriately located and operated in a manner that ensures any releases are contained and remediated.
- Ensure that local runoff does not contribute pesticides or other contaminants to groundwater supplies through appropriate drainage measures.

Some of the information required for the field verified survey may be available from the sources in Chapter 11.4.

8.2.3 Evaporative Losses from End Pit Lakes

End pit lakes (surface water bodies in the Code) are water storage projects. Water allocation for these types of projects is based on the amount of water needed to replenish annual net evaporative losses from these end pit lakes.

The volume of water needed to replenish the loss is a product of the unit net evaporative loss and the flooded area of the lake at full supply level. The unit net evaporative loss is calculated as the difference between precipitation and evaporative losses. Precipitation and evaporative loss data can be obtained from Environment Canada (http://www.climate.weatheroffice.ec.gc.ca/climate_normals/index_e.html).

Water allocation (acre-feet) = flooded area (acres) at full supply level x unit net evaporative loss (feet)

Unit net evaporative loss (feet) = evaporative loss (feet) - precipitation (feet)

A professional engineer may also use their judgement in following empirical methods for calculating unit evaporative losses.

Once the net evaporative loss is calculated, Alberta Environment will determine if a *Water Act* license for this allocation will be issued. Pit registration holders should determine as early as possible if a license will be granted. If an allocation cannot be granted, or will be granted for a lesser amount of water, the site reclamation plans will have to be adjusted. This may include a requirement to exclude an end-pit lake as a reclamation option. Pit registration holders should also determine who will apply for the *Water Act* license.

8.2.4 Information Required When Applying

The *Water Act* application should be submitted to the local Alberta Environment office. Along with the application, plans showing the water source location, details of the water diversion works and point source outlet should be included. Pit registration holders should contact the local Alberta Environment office to determine what information is required with an application for water use.

Pit registration holders should consult the documents listed in Section 12.4 for further information regarding the process to obtain *Water Act* approvals, licences, or temporary diversion licences.

8.3 Other Provincial Legislation

8.3.1 Public Highways Development Act

The *Highway Development Control Regulation* establishes setback distances for construction of ditches and utility lines, development and signage within a controlled highway. Pits may have a setback requirement imposed under this Act and registration holders may be required to obtain a development permit from Alberta Transportation to develop a pit within the setback requirements.

8.3.2 Pipeline Act

This Act is administered by the Alberta Energy and Utilities Board and establishes minimum setback distances from energy pipelines. General Bulletin 99-04 *"Land Development*

Information Package" Introducing a New Service (http://www.eub.gov.ab.ca/BBS/requirements/ils/gbs/gb99-04.htm) provides information on recommended setback distances from pipelines.

8.3.3 Oil and Gas Conservation Act

This Act is administered by the Alberta Energy and Utilities Board (EUB). General Bulletin 99-04 *"Land Development Information Package" Introducing a New Service* (http://www.eub.gov.ab.ca/BBS/requirements/ils/gbs/gb99-04.htm) provides information on recommended setback distances from abandoned wells.

The EUB endorses the recommendations of draft document *Advisory Land Use Planning Notes - Abandoned Oil and Gas Wells*. This document recommends permanent structures be setback at least five metres from abandoned wells, and underground utilities be set back at least three metres. It also advises to maintain a working space of at least 10 metres by 15 metres around the well, along with an access route not less than 8 metres wide. These areas are necessary in the unlikely event a well service rig is required. Also discussed are implications for abandoned wells where site development such as grading, roadways, and underground utilities is planned. The *Advisory Land Use Planning Notes - Abandoned Oil and Gas Wells* is available from Information Services at the EUB.

8.3.4 Public Lands Act

This Act applies to public land that is owned by the crown in right of Alberta and is administered by Alberta Sustainable Resource Development. The *Public Lands Act* authorizes and regulates the allocation and use of public land. This Code of Practice does not apply to public lands. Registration holders who wish to operate a pit on public land should contact the local Public Lands office and refer to the document *A Guide to "Surface Material" Resource Extraction on Public Land.*

Registration holders should also be aware that the *Public Lands Act* applies to pits that are located within or affect the bed and shore of a water body or watercourse.

8.3.5 Weed Control Act

Under this Act, the registration holder is defined as the "occupant" of the land and is liable for the spread of any weed seeds. The registration holder must eliminate restricted weeds, control noxious weeds, and prevent the spread of nuisance weeds. Municipalities may change the classification of a weed species upwards (e.g., from nuisance to noxious) so the registration holder should check status with the local weed inspector.

Under Sections 34 and 35 of the Act that:

> No person shall deposit or permit to be deposited weed seeds or material containing weed seeds in a place where they might grow or spread and no person shall move a machine or vehicle if the movement is likely to cause the spread of a restricted, noxious or nuisance weed.

This means that importing soil that contains weeds or moving equipment on to the pit that has not been cleaned may result in violation of the Act.

8.3.6 Historical Resources Act

This Act is administered by Alberta Community Development and ensures the preservation of historical resources in Alberta (i.e., historic, archaeological and paleontological resources). Registration holders may be required to shut down if artefacts are discovered during operation of the pit.

Registration holders should review the *Listing of Significant Historical Sites and Areas* (Alberta Community Development, 2001 http://www.cd.gov.ab.ca/preserving/heritage/PandS/significant_sites/index.asp) to determine if any designated historic sites (i.e., Provincial Historic Resources, Registered Historic Resources) or other significant historical resources are situated within the proposed development area and consider completing a field study or assessment prior to starting a new operation.

8.3.7 Codes of Practice

Registration holders are responsible for ensuring compliance with applicable Codes of Practice established under the *Environmental Protection and Enhancement Act* and the *Water Act*. The following Codes may be applicable.

Code of Practice for Asphalt Paving Plants

This Code of Practice became effective September 30, 1996 and outlines the minimum requirements that asphalt paving plants that produce hot or cold mix asphalt must meet to ensure environmental protection. It includes pollution control technology, operating, record keeping, and reporting requirements. The Code of Practice was made under the *Substance Release Regulation*. Persons responsible for plants under this Code of Practice must register with Alberta Environment prior to commencing operation of an asphalt paving plant and notify Alberta Environment when the plant is moved.

Code of Practice for Watercourse Crossings

This Code of Practice became effective May 1, 2000 and was made under the *Water (Ministerial) Regulation*. It outlines the minimum requirements that watercourse crossings must meet.

Registration holders may be required to comply with this Code of Practice when constructing, maintaining or upgrading an access road to their operations if it affects a watercourse or water body.

Code of Practice for Pipeline and Telecommunication Lines Crossing a Water Body

This Code of Practice became effective May 1, 2001 and was made under the *Water (Ministerial) Regulation*. It regulates the construction of pipelines and telecommunication lines under a water body.

Registration holders who are planning to use a pipe to transmit water to or from a pit may be subject to this Code of Practice.

Code of Practice for Outfall Structures on Water Bodies

This Code of Practice became effective in September 2003 and was made under the *Water (Ministerial) Regulation*. It regulates the construction of an outfall structure (i.e., a pipe or

structure in, on under or adjacent to a water body) that discharges precipitation that has been collected or liquid and water-carried wastes to a water body.

Registration holders who are planning to discharge pit water to a water body should determine if they are subject to this Code of Practice.

8.4 Federal Legislation

8.4.1 Fisheries Act

Fisheries and Oceans Canada administers this Act. Offices are located in Lethbridge, Calgary, Edmonton and Peace River (http://www.dfo-mpo.gc.ca/regions/central/fish-peches/addresses_e.htm#PrairieOffices).

The Act promotes:

- Proper management and control of fisheries
- Conservation and protection of fish
- Protection of fish habitat

Two sections of the *Fisheries Act* are of particular relevance to pit operators, mostly with respect to deposit of silt and sediment into a water body, but also in cases where a water body will be altered or destroyed:

> 35(1) No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat
>
> (2) No person contravenes subsection (1) by causing the alteration, disruption or destruction of fish habitat by any means or under any conditions authorized by the Minister or under regulations made by the Governor in Council under this Act.
>
> 36(3) Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.
>
> (4) No person contravenes subsection (3) by depositing or permitting the deposit in any water or place of
>
> > (a) waste or pollutant of a type, in a quantity and under conditions authorized by regulations applicable to that water or place made by the Governor in Council under any Act other than this Act; or
> >
> > (b) a deleterious substance of a class, in a quantity or concentration and under conditions authorized by or pursuant to regulations applicable to that water or place or to any work or undertaking or class thereof, made by the Governor in Council under subsection (5).

8.4.2 Navigable Waters Protection Act

The Canadian Coast Guard administers this Act, which ensures that the construction, placement, repairing or modification of any work which will substantially interfere with navigation in, over, under, through or across any navigable waterway in Canada is approved by the Minister of

Fisheries and Oceans. Thus works such as bridges or culverts for access roads may be subject to the Act.

More information is available at http://www.ccg-gcc.gc.ca/cen-arc/nwp-pen/activities_e.htm.

8.4.3 Canadian Environmental Assessment Act

The *Canadian Environmental Assessment Act* is the legal basis for the federal environmental assessment process. The Act is administered by the Canadian Environmental Assessment Agency.

The Act sets out the responsibilities and procedures for carrying out the environmental assessments of projects that involve federal government decision-making. A number of regulations have been established under the Act. Some are essential to the functioning of the Act. Others apply in special circumstances.

The federal environmental assessment process is applied whenever a federal authority has a specified decision-making responsibility in relation to a project, also known as a "trigger" for an environmental assessment.

Specifically, it is when a federal authority:

- proposes a project
- provides financial assistance to a proponent to enable a project to be carried out
- sells, leases, or otherwise transfers control or administration of federal land to enable a project to be carried out
- provides a licence, permit or an approval that is listed in the Law List Regulations that enables a project to be carried out

It is this last bullet that would most likely apply to a pit, specifically when a *Fisheries Act* authorization is needed.

More details are available on the CEAA website at http://www.acee-ceaa.gc.ca/010/basics_e.htm#8.

8.4.4 Species at Risk Act

The *Species at Risk Act* (SARA) was proclaimed in June 2003, and is one part of a three-part Government of Canada strategy for the protection of wildlife species at risk. The Act complements existing Acts and agreements to provide for the legal protection of wildlife species and conservation of biological diversity. The Act aims to prevent wildlife species from becoming extinct, and to secure the necessary actions for their recovery.

More information is available at Environment Canada's website http://www.sararegistry.gc.ca/default_e.cfm

8.4.5 Migratory Birds Convention Act, 1994

The purpose of this Act is to implement the Migratory Birds Convention by protecting migratory birds and nests. The Act and its Regulations may restrict the periods during which birds may be killed and nests may be damaged. More information is available at Environment Canada's website at http://www.cws-scf.ec.gc.ca/legislations/laws1_e.cfm

9.0 CHECKLISTS AND FORMS

The following checklists and forms can help guide the completion of the Registration Application, Activities Plan, Security Estimate, Five-Year Report and Final Reclamation Report. Keeping the information in the same order as the forms will help speed processing of the submission. Applicants should review the specific details required for each section in the Code of Practice.

9.1 Registration Application Checklist and Form

- ☐ The registration applicant's information – the person/company in whose name the registration should be issued
- ☐ Information on the person who submitted the application – may be the same as above or may be a consultant
- ☐ Signature of the person who submitted the form
- ☐ The primary contact's information – the person who will be contacted with questions about day-to-day pit operations
- ☐ The legal location of the pit – include access roads, stockpiles sites and all other locations where infrastructure is present
- ☐ The registered land owner's information – include all the names on each title
- ☐ The occupant's information – indicate "none" or "not applicable" if there is no occupant

Code of Practice for Pits

Registration Application (Schedule 1)

Date: _____

Previous *Environmental Protection and Enhancement Act* Approval Number: _____

Water Act authorization required? ☐ Yes ☐ No

If Yes, ☐ application submitted or current *Water Act* Authorization Number: _____

Name of Applicant (company or person in whose name the pit will be registered):

_____

Address: _____

Phone: _____ Facsimile: _____

e-mail: _____

Name of Person Submitting Application: _____

Company Name: _____

Job Title: _____

Address: _____

Phone: _____ Facsimile: _____

e-mail: _____

Signature: _____

Name of Primary Contact for Pit: _____

Job Title: _____

Address: _____

Phone: _____ Facsimile: _____

e-mail: _____

Pit Location Municipal Address or LSD-Sec-Twp-Rge-Mer	Registered Owners Name, Address and Phone Number	Occupants Name, Address and Phone Number

9.2 Activities Plan Checklist and Form

Items on the checklist that are indented are useful for preparing the application but are not required to be submitted.

Part 1

- ☐ The type of product that will be removed
- ☐ The current pit size – include access roads, stockpile sites and all other locations where infrastructure is present. If there is no pit indicate Not Applicable or No Pit Yet
- ☐ The average thickness (in centimetres or metres) of each of topsoil, subsoil, overburden, and aggregate
- ☐ The texture(s) of the topsoil - organic soil, mineral soil, clay loam, silty loam, sand, sandy loam, loam, clay, silt, or other (describe)
- ☐ The techniques that will be used to prevent wind and water erosion and control dust
- ☐ Involvement in local or regional air monitoring programs
- ☐ Inactive pit reclamation plans – for portions of the pit that will be inactive for more than two years
- ☐ Scale drawings of existing pit conditions and the proposed pit operations
- ☐ Cross-section drawings of the pit
  - ☐ Aggregate and overburden inventory or testing reports
  - ☐ Estimated percentage of the deposit that is reject material
  - ☐ The texture of the subsoil – clay, heavy clay, silt, silty clay, sand, sandy clay, or other (describe)

Part 2

- ☐ The maximum planned pit size – include access roads, stockpiles sites and all other locations where infrastructure will be present
- ☐ The depth to water in any test holes; indicate depth in each test hole where water was found
- ☐ The type of operation(s) at the pit - wet pit excavation, concrete production, salt mixing, asphalt mixing, spraying truck box liners, aggregate washing, use of other materials for reclamation
- ☐ Measures to prevent or mitigate adverse effects from the above activities
- ☐ The proposed end land uses and their percentage of the reclaimed landscape – cultivation, hayland, pasture, native range, grassland, forest, wildlife habitat, water body, proposed subdivision, other (describe)
- ☐ Information on the release of pit water – need for release, methods, location, timing
- ☐ Replacement thickness of topsoil and subsoil
- ☐ Scale drawings of the reclaimed pit

- ☐ Cross-section drawings of the reclaimed pit
- ☐ Reclaimed surface water body information
  - ☐ The average depth of excavation including the removal of topsoil, subsoil, overburden and materials
  - ☐ The expected life of the deposit in years
  - ☐ The equipment that will be used for removing and replacing topsoil and subsoil – bulldozer, grader, scraper/ buggy, front end loader, other (describe)
  - ☐ How the property boundaries and buffers have been located and marked
  - ☐ The extraction setback – show calculation for each different setback
  - ☐ A detailed description of the quality, depth and variation of any groundwater encountered in test holes or identified from surveys, databases or reports
  - ☐ The CLI soil capability class for agriculture of the pre-disturbed landscape and the expected capability class in the reclaimed landscape – the relationship of slopes to soil capability classes are

Class 1, 2, 3	Level, nearly level or very gentle slopes no steeper than 20:1
Class 4	Gentle slopes; no steeper than 10:1
Class 5	Moderate slopes; no steeper than 6:1
Class 6	Strong slopes; no steeper than 3:1
Class 7	Very strong slopes; no steeper than 2:1

  - ☐ The seed mixtures or other forms of revegetation to be used.
  - ☐ Signature and title of person who developed the Activities Plan

Activities Plan (Schedule 2)

Part 1 Information

Aggregate Type (check off all that apply): ☐ Gravel ☐ Sand ☐ Clay ☐ Marl

Current Size of Pit: _____ (hectares / acres)

Average Thickness (indicate metres or centimetres for each one):
Topsoil _____ Subsoil _____ Overburden _____ Aggregate _____

Topsoil Texture (check all that apply):
☐ organic soil ☐ mineral soil ☐ clay loam ☐ silty loam ☐ sand ☐ sandy loam
☐ loam ☐ clay ☐ silt ☐ other _____

Description of techniques to prevent wind and water erosion, and to limit the movement of dust from the pit: _____

_____

Participation in local or regional air monitoring initiative: _____

Inactive pit conservation and reclamation techniques: _____

_____

☐ Scale drawings and cross-sections of existing pit conditions and planned sequence of operation attached.

Part 2 Information

Maximum planned size of pit: _____ (hectares / acres)

Depth to groundwater (metres) in test holes (indicate each depth if multiple holes): _____

Planned activities at the pit (check off all that apply): ☐ wet pit excavation
☐ concrete production ☐ mixing salt and aggregate ☐ mixing asphalt with aggregate
☐ spraying truck boxes ☐ aggregate washing ☐ use of alternative materials for reclamation

Mitigative measures for all of the above activities: _____

_____

Proposed land uses for reclaimed pit (check all appropriate boxes):

☐ cultivation _____%	☐ hayland _____%	☐ pasture _____%
☐ native range _____%	☐ grassland _____%	☐ forest _____%
☐ wildlife habitat _____%	☐ waterbody _____%	☐ proposed subdivision _____%
☐ other (specify) _____%		

Pit water release (rationale for release, techniques and discharge points): _____

_____

Average topsoil replacement depth (cm): _____
Average subsoil replacement depth (cm): _____

☐ Scale drawings and cross-sections of reclaimed pit conditions attached.

Description of surface water bodies in the reclaimed pit:
Design: _____
Intended use: _____

Water elevation at full supply level: _____

Slope of land one metre above full supply level: _____

Slope of land one metre below full supply level: _____

Signature and title of person who developed Activities Plan: _____

9.3 Security Estimate Checklist and Form

- ☐ The area of land (in acres) secured at $250/acre
- ☐ Calculation details for full-cost security on the remainder of the disturbed land
- ☐ The area (in acres or hectares) covered by the full-cost security above and the average cost per acre or hectare of the full-cost security
- ☐ Proposal for the amount of security (total of $250/acre security plus full-cost security)
- ☐ Proposal for the form of security to be provided
- ☐ Signature and title of person submitting the security estimate

Security Estimate (Schedule 3)

Acres of land certified at $250/acre: _____ Acres x $250 = _____ (a)

☐ Detailed full-cost security calculation attached Total full-cost = _____ (b)

Area of land at full-cost _____ (hectares / acres) Cost/hectare or acre = _____

Total security to be provided ((a) + (b)): _____

Proposed method of payment: ☐ Letter of Credit ☐ Cash ☐ Other (explain) _____

Signature and title of person submitting estimate: _____

9.4 Five-Year Report Checklist and Form

The report is due five-years after the date of the registration and every five years afterwards until the date of submission of the Final Reclamation Report or until the entire pit has been certified, whichever comes first.

- ☐ The registration number – make sure it is for the correct pit
- ☐ The legal location of the pit – include access roads, stockpiles sites and all other locations where infrastructure is present
- ☐ Total area of pit – all lands that have been disturbed by pit activities over the life of the pit (including lands disturbed by a previous operator whom transferred the registration to you)
- ☐ Active area – sum of the areas of the pit where aggregate is being extracted or processed, stockpiles are placed and infrastructure is located
- ☐ Reclaimed area – the area of a pit where the landscape has been re-established, the topsoil has been replaced and vegetation has been established, but does not include any certified area
- ☐ Certified area - the area of a pit that is the subject of a reclamation certificate
- ☐ Check to ensure that the values reported make sense in this report (e.g., Total Area = active + reclaimed + certified) and when compared to the previous report
- ☐ Scale drawing of pit attached
- ☐ Date pit size measured – must be less than 60 days prior to the report date
- ☐ Date scale drawing made – must be less than 60 days prior to the report date
- ☐ Signature and title of person submitting the form

Five-Year Report (Schedule 4, Part 1)

Pit Registration Number: _____ Date: _____

Name of registration holder: _____

Address: _____

Phone: _____ Facsimile: _____

e-mail: _____

Pit Location Municipal Address or LSD-Sec-Twp-Rge-Mer

Pit size:

Total area (hectares / acres): _____

Active area (hectares / acres): _____

Reclaimed area (hectares / acres): _____

Certified area (hectares / acres): _____

☐ Scale drawing of pit attached

Date pit size measured: _____

Date drawing made: _____

Signature and title of person submitting form: _____

9.5 Final Report Checklist and Form

The report is due no later than 3 years after the entire pit has been revegetated. The report does not need to be sent in if the entire site has received a reclamation certificate.

- ☐ The registration number – make sure it is for the correct pit
- ☐ The legal location of the pit – include access roads, stockpiles sites and all other locations where infrastructure is present
- ☐ The registered land owner's information – include all the names on each title
- ☐ Total area of the pit - all lands that have been disturbed by pit activities over the life of the pit (including lands disturbed by a previous operator whom transferred the registration to you)
- ☐ Scale and cross-section drawings of reclaimed pit
- ☐ Written acknowledgement of all registered landowners that they received the report
- ☐ Signature and title of person submitting the form

Final Reclamation Report (Schedule 4, Part 2)

Pit registration number: _____ Date: _____

Name of registration holder: _____

Address: _____

Phone: _____ Facsimile: _____

e-mail: _____

Pit Location Municipal Address or LSD-Sec-Twp-Rge-Mer	Registered Owners Name, Address and Phone Number

Pit size:

Total area (hectares / acres): _____

☐ Scale and cross-section drawings of reclaimed pit attached

☐ Written acknowledgement of all registered landowners that they received this report attached

Signature and title of person submitting form: _____

10.0 SAMPLE DRAWINGS

10.1 Sample Plan 1

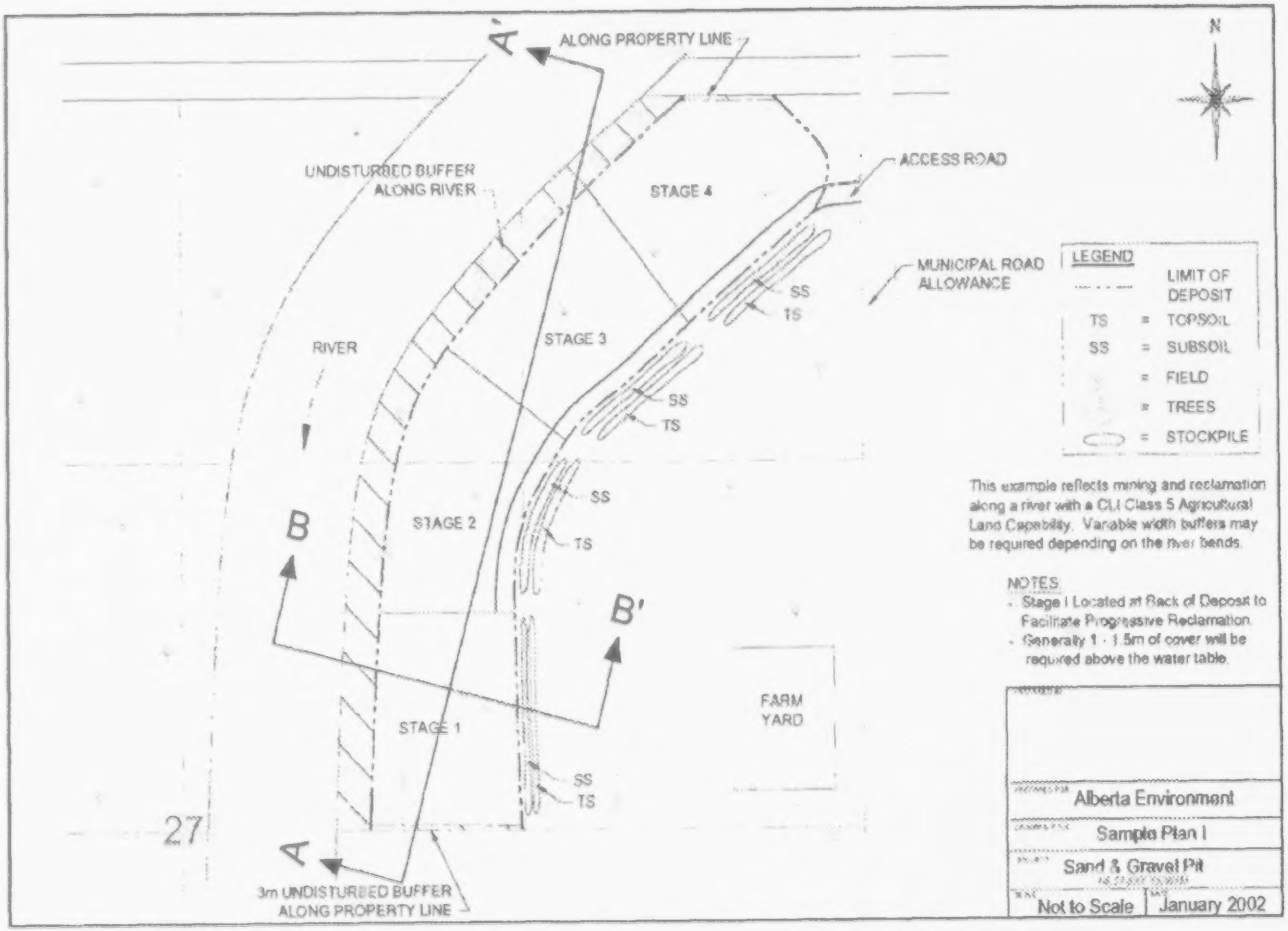
The purpose of this plan is to show a typical drawing of a simple mining operation where direct placement of reclamation material will not take place.

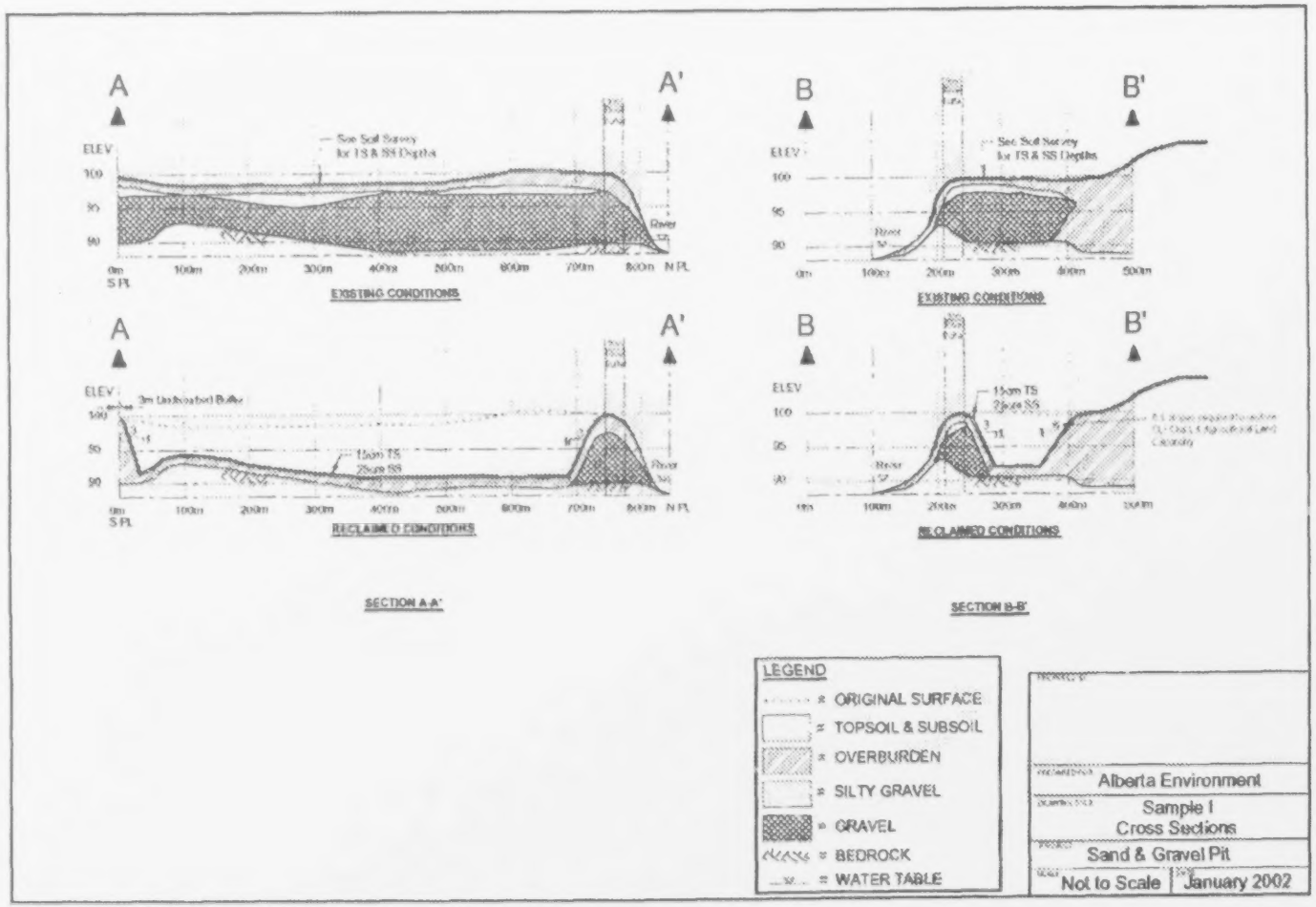
All the salvaged reclamation material (topsoil, subsoil and overburden) has been stockpiled at each stage and will be replaced in that stage, once the mining is completed. To ensure the stages can be progressively reclaimed the sequence of the extraction starts at the remotest part of the deposit and the pit advances toward the initial access point.

All long term infrastructure and product stockpiles should be located on pre-stripped portions of the final stage. Short term infrastructure and product stockpile sites can be located in the current operating stage, moving to the next stage as mining progress.

Plan drawings must be drawn to scale.

Cross-section drawings should be drawn to scale where possible. If this is not possible or practical then the cross-section drawings should clearly show dimensions and slopes.


A
ALONG PROPERTY LINE
N
UNDISTURBED BUFFER
ALONG RIVER
ACCESS ROAD
STAGE 4
MUNICIPAL ROAD
ALLOWANCE
LEGEND
LIMIT OF DEPOSIT
TS = TOPSOIL
SS = SUBSOIL
= FIELD
= TREES
= STOCKPILE
SS
TS
RIVER
STAGE 3
SS
TS
B
STAGE 2
SS
TS
B'
FARM
YARD
STAGE 1
SS
TS
27
A
3m UNDISTURBED BUFFER
ALONG PROPERTY LINE
This example reflects mining and reclamation along a river with a CLI Class 5 Agricultural Land Capability. Variable width buffers may be required depending on the river bends.
NOTES
- Stage I Located at Back of Deposit to Facilitate Progressive Reclamation
- Generally 1 - 1.5m of cover will be required above the water table
Alberta Environment
Sample Plan I
Sand & Gravel Pit
Not to Scale
January 2002


A
A'
ELEV
100
95
90
See Soil Survey for TS & SS Depths
River
0m
S.PL
100m
200m
300m
400m
500m
600m
700m
800m
N.PL
EXISTING CONDITIONS
B
B'
ELEV
100
95
90
See Soil Survey for TS & SS Depths
River
0m
100m
200m
300m
400m
500m
EXISTING CONDITIONS
A
A'
ELEV
100
95
90
3m Undisturbed Buffer
15cm TS
25cm SS
River
0m
S.PL
100m
200m
300m
400m
500m
600m
700m
800m
N.PL
RECLAIMED CONDITIONS
B
B'
ELEV
100
95
90
15cm TS
25cm SS
River
100m
200m
300m
400m
500m
RECLAIMED CONDITIONS
SECTION A-A'
SECTION B-B'
LEGEND
= ORIGINAL SURFACE
= TOPSOIL & SUBSOIL
= OVERBURDEN
= SILTY GRAVEL
= GRAVEL
= BEDROCK
= WATER TABLE
Alberta Environment
Sample I
Cross Sections
Sand & Gravel Pit
Not to Scale
January 2002

10.2 Sample Plan II

The purpose of this plan is to show a typical drawing of a complex mining operation where direct placement of reclamation material is to take place. When topsoil, subsoil, and overburden need to be salvaged and kept separate, prior to actually directly placing the material onto a depleted area, initial stockpiles will have to be established.

The first stage will require the stockpiling of all three materials (topsoil, subsoil, overburden); the second stage will require the stockpiling of the first two layers and allow direct placement of the third (overburden) back into the first stage; the third stage will require the stockpiling of the first layer and allow direct placement of the next two (subsoil and overburden) into the first and second stages; the fourth stage will not require any stockpiling as all three layers can now be placed directly back into the appropriate stage, maintaining the correct position of the soil layers. All remaining stages can now directly place the reclamation material on depleted portions of the pit.

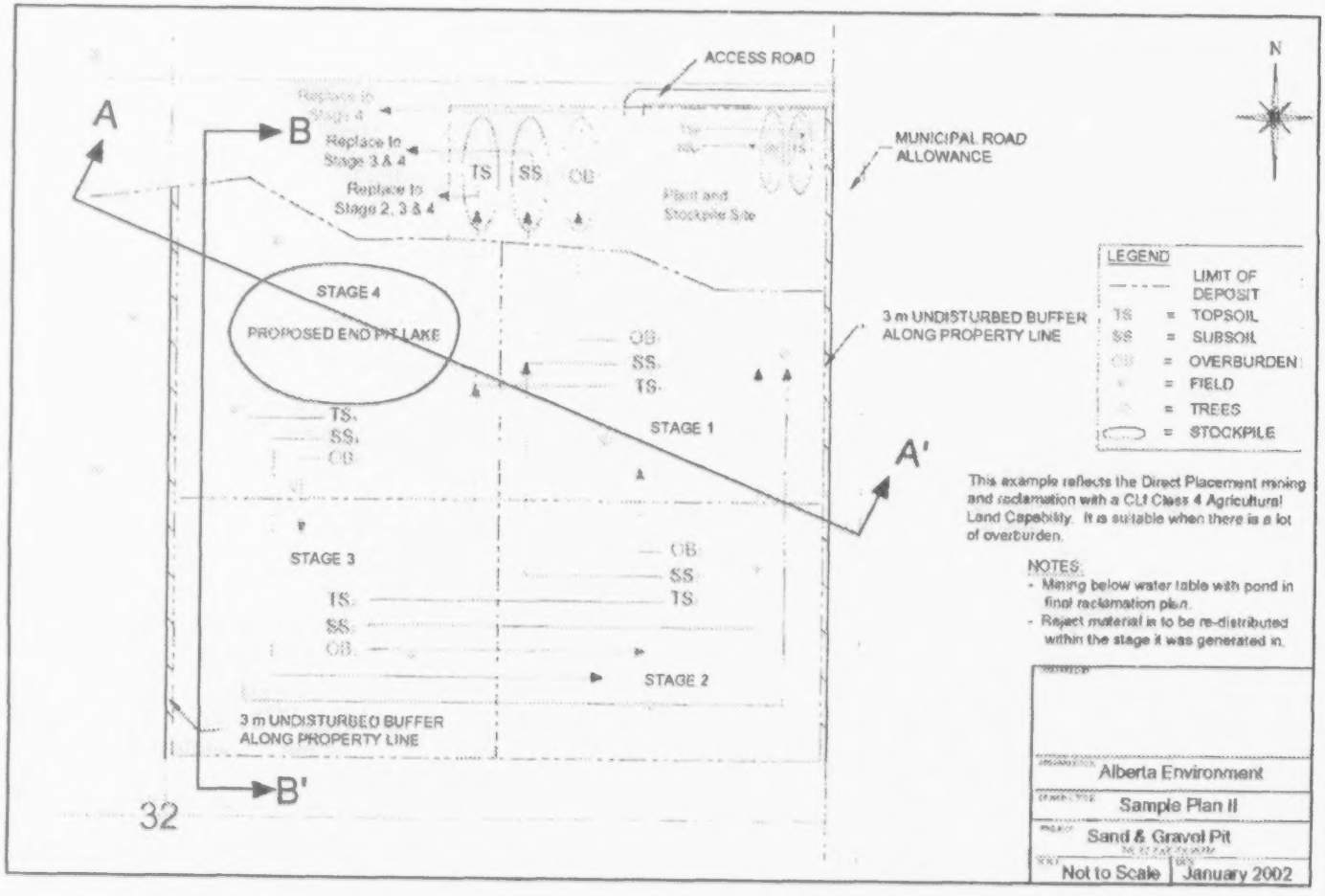
Where possible the initial stockpile area should be established close to the proposed final stage, to reduce the cost of hauling.

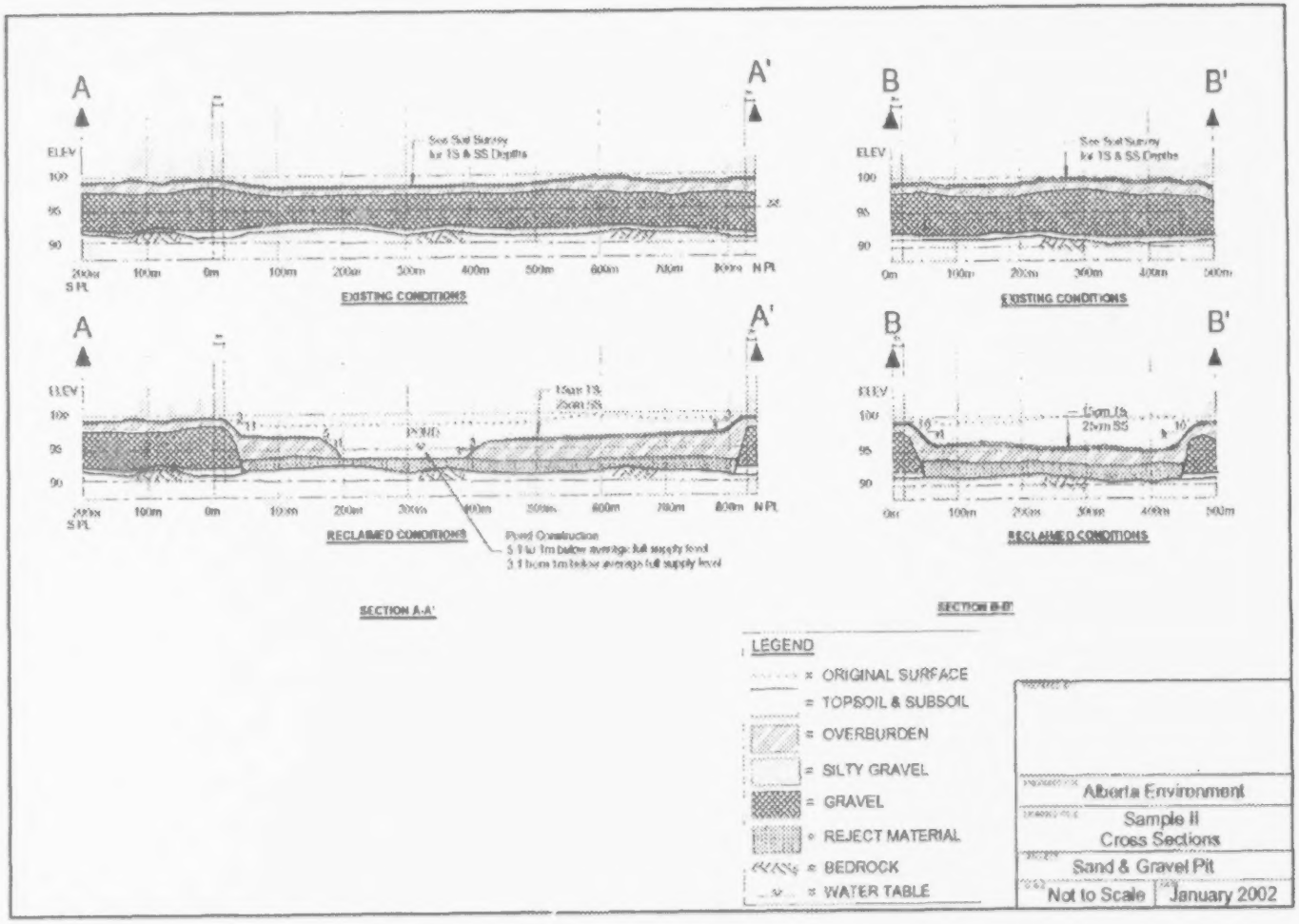
A separate area outside the deposit may be required to accommodate the product stockpiles and infrastructure. This area will need to have the topsoil and subsoil salvaged for it's future reclamation.

If a portion of the pit's end land-use is a lake, the excess reclamation material can be utilized to ensure the intended reclamation goals are met on other portions of the pit.

Plan drawings must be drawn to scale.

Cross-section drawings should be drawn to scale where possible. If this is not possible or practical then the cross-section drawings should clearly show dimensions and slopes.


ACCESS ROAD
N
A
B
Replace to Stage 4
Replace to Stage 3 & 4
Replace to Stage 2, 3 & 4
TS
SS
OB
Plant and Stockpile Site
MUNICIPAL ROAD ALLOWANCE
STAGE 4
PROPOSED END PIT LAKE
3 m UNDISTURBED BUFFER ALONG PROPERTY LINE
STAGE 1
A'
STAGE 3
STAGE 2
3 m UNDISTURBED BUFFER ALONG PROPERTY LINE
B'
32
LEGEND
LIMIT OF DEPOSIT
TS = TOPSOIL
SS = SUBSOIL
OB = OVERBURDEN
= FIELD
= TREES
= STOCKPILE
This example reflects the Direct Placement mining and reclamation with a CLI Class 4 Agricultural Land Capability. It is suitable when there is a lot of overburden.
NOTES:
- Mining below water table with pond in final reclamation plan.
- Reject material is to be re-distributed within the stage it was generated in.
Alberta Environment
Sample Plan II
Sand & Gravel Pit
Not to Scale
January 2002


A
A'
ELEV
100
95
90
See Soil Survey for TS & SS Depths
200m S PL
100m
0m
100m
200m
300m
400m
500m
600m
700m
800m N PL
EXISTING CONDITIONS
B
B'
ELEV
100
95
90
See Soil Survey for TS & SS Depths
0m
100m
200m
300m
400m
500m
EXISTING CONDITIONS
A
A'
ELEV
100
95
90
15cm TS
25cm SS
200m S PL
100m
0m
100m
200m
300m
400m
500m
600m
700m
800m N PL
RECLAIMED CONDITIONS
Flood Construction
TS 1 to 1m below average full supply level
SS 1 to 3m below average full supply level
SECTION A-A'
B
B'
ELEV
100
95
90
15cm TS
25cm SS
0m
100m
200m
300m
400m
500m
RECLAIMED CONDITIONS
SECTION B-B'
LEGEND
= ORIGINAL SURFACE
= TOPSOIL & SUBSOIL
= OVERBURDEN
= SILTY GRAVEL
= GRAVEL
= REJECT MATERIAL
= BEDROCK
= WATER TABLE
Alberta Environment
Sample II
Cross Sections
Sand & Gravel Pit
Not to Scale
January 2002

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